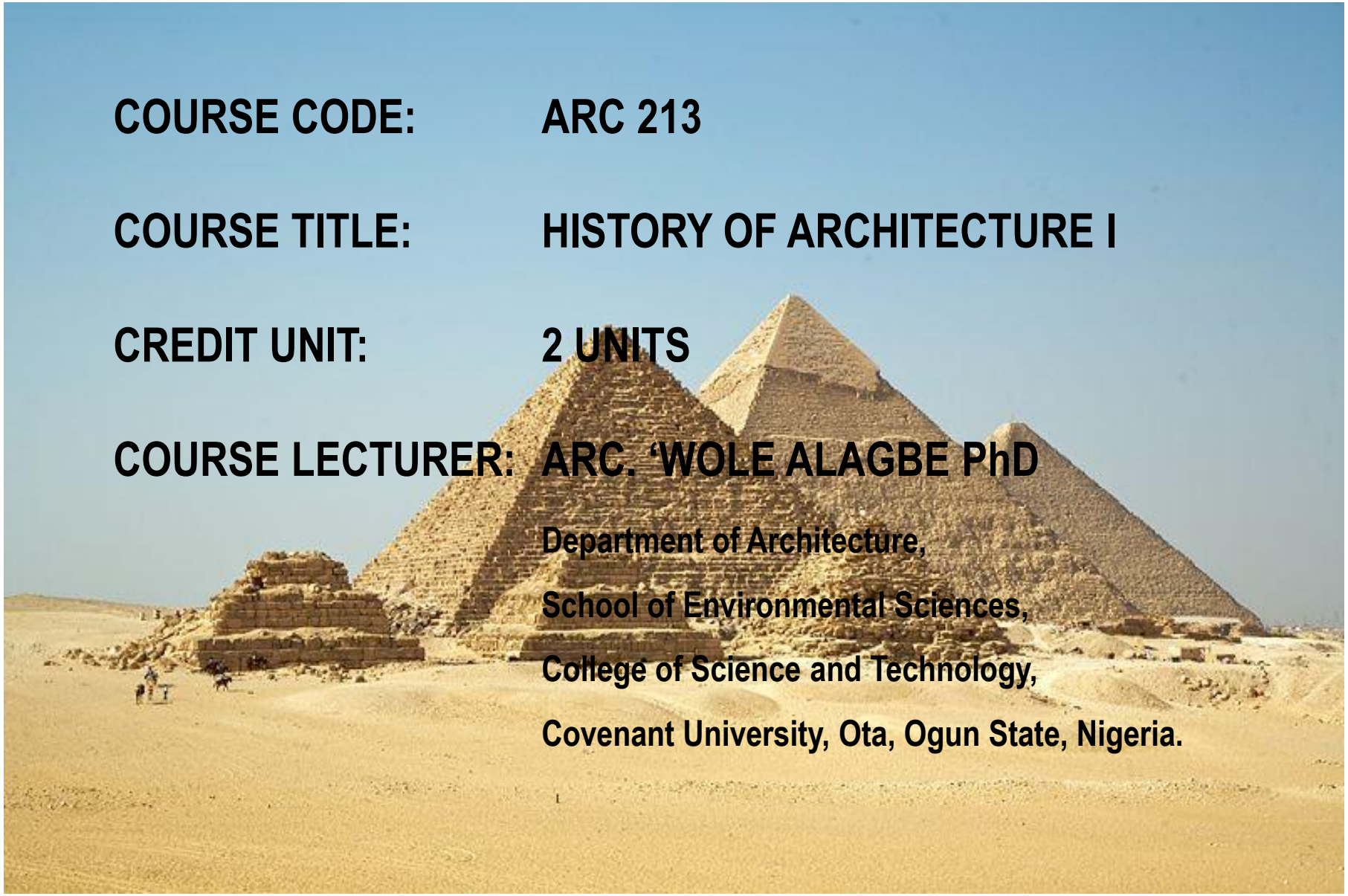

COURSE CODE: ARC 213

COURSE TITLE: HISTORY OF ARCHITECTURE I

CREDIT UNIT: 2 UNITS

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ARC 213-HISTORY OF ARCHITECTURE I

COURSE AIM

- Analytical study of past architectural antecedents will aid in acquainting students' with our architectural heritage and arousing interest in postulating architectural solutions that are responsive to the built environment of this civilization

COURSE OBJECTIVES

- Chronicle how the architecture of earlier civilizations evolved to Modern architecture of this age i.e. tradition cannot be jettisoned in architecture otherwise there would be no forms at all. (Joachim Winckleman, Marc-Antonine Laugier).
- Acquaint us with architectural innovations and shortcomings of past civilizations using it as a springboard to forge a better understanding of the present.
- Evaluate how influences such as climate, topography, location, religion, creativity and purpose affect the architecture of a place.
- To understand how development and refinement in civilization and age of learning, positively enhances architectural possibilities and structural innovations.
- Ultimately, students must understand that the building materials available and the technology developed to utilize them through different civilizations largely determine the nature of the architecture of that civilization.

BACKGROUND UNDERSTANDING OF ARCHITECTURE

WHAT IS ARCHITECTURE?

- Architecture is the art and science or technique of designing and building which must demonstrate the solution of the practical problems associated with the purpose of building such as beauty and utility, and form and function.

WHAT IS HISTORY OF ARCHITECTURE?

- History of architecture is the study of the chronological record of events (as affecting a nation or people), based on a critical examination of architectural source materials and usually presenting an explanation of their causes from ancient periods to the present day.

PURPOSE OF ARCHITECTURE

- To fulfil both practical and expressive requirements; through both utilitarian and aesthetic means.
- Almost every settled society uses their building techniques to produce various indigenous and regional architectural styles unique to them such as Egyptian, Greek, Roman, Japanese, renaissance, modern, e.t.c.
- Serves man as a form of defence against the natural environment
- Gives man the benefits of a human environment (built environment), a prerequisite for and a symbol of the development of civilized institutions.

GENERAL OVERVIEW (ANCIENT – MODERN PERIOD)

A. ANCIENT ARCHITECTURE

- Ancient man lived in natural shelter provided by caves.
- Due to his nomadic nature, he started construction activity of building of huts with bamboos and thatched leaves.
- The huts protected him from:
  - Inclement elements of weather such as sun, wind and rain.
  - The huts gave him security from wild animals.
  - It gave him time to research for new construction materials eg. mud, bricks and stone.
- Early man got inspiration from nature in the form of shapes and colour of leaves and flowers, and exploited their effects on the eyes and mind.
- He soon started constructing different types of huts with walls, roofs, floors, doors and windows.
- However, he was not satisfied with his hut, so he started thinking of improving its utility.
- He realized that certain proportions of doors, windows, height and width of walls, certain colour combinations and textures were more aesthetically appealing.
- He also observed that various forms, such as cubes, cones, spheres, cylinders or pyramids seen in light and shade created varied impressions on the mind of the observer.
- Constructional forms changed gradually as art introduced itself into construction with new ideas of utility, form and feeling for aesthetics.
- All these crude developments in his architectural utilities are evidence of refinement in civilization of the early people.

GENERAL OVERVIEW (ANCIENT – MODERN PERIOD)

B. WHAT IS CIVILIZATION?

- Civilization is the system or stage of social development from a savage or ignorant condition to a refined or a developed stage.
- The architectural forms perfected during the early civilizations have influenced visual standards in Western civilization ever since.

C. EGYPTIAN ARCHITECTURE

- Civilization stated with the Egyptian who introduced remarkable architectural forms such as the arch, colonnades, pyramids and temples.
- The Egyptians constructed huge pyramids i.e. tombs for their kings and temples for their gods in which they used blocks of stones for posts and lintels.
- The period of Egyptian civilization was between about 5000BC to its conquest by Rome in 30BC.

D. BABYLONIANS, ASSYRIANS AND PERSIANS PERIOD

- The Babylonians, Assyrians and Persians brought about civilization to the growth and flexibility of architecture.
- The latter conquered the former respectively and each adopted architectural ideas from the vanquished.
- The Assyrians built bulky columns for obvious supports and for defense against aggression from other colonies.
- The Persians conquered the Assyrians and refined the shapes of columns to be less bulky and less obvious supports by reducing their shafts in section.
- They introduced slight surface variations and enriched mouldings gave live to the entablatures that united rows of columns horizontally above their carved capitals.

GENERAL OVERVIEW (ANCIENT – MODERN PERIOD)

E. GREEK ARCHITECTURE

- The Greeks were predominantly good in literature and architecture.
- They clearly reflect the progress of the soul of man (intuitive thinking).
- The civilization of Greece cannot be traced down to any known civilization but was mainly a creation of their restless, innovating and challenging mind.
- The Greeks could not exercise all these rights under the Persian rule until the latter were overthrown by Alexander the Great around 338BC.
- This independence led to Greek architecture achieving magnificence and mastery of composition.
- Greek architecture as demonstrated in the buildings they designed and erected (temples, fountain house, agora, theatres, public baths) were in themselves documents of their civilization than any single work of Greek literature.
- In this sense, architecture might be called the sheet anchor of history, without which the everlasting testimony of the monuments would certainly become null and void.
- Greek architecture was influenced by the factors of religion, history and social rather than of materials available.
- The Greeks developed a style of proportion known as “order of architecture”.
- An order of architecture is a systematic proportioning of the base, column and entablature related to the diameter of a column.
- It is said that these orders were based on the proportions of the human body.
- The orders are Doric, Ionic and Corinthian.

GENERAL OVERVIEW (ANCIENT – MODERN PERIOD)

F. ROMAN ARCHITECTURE

- The Roman republic started in 509BC after the overthrow of the Greeks.
- The Romans used arches for vaults and domes.
- They utilized pozzolana sand, mortar, plaster and concrete.

G. MEDIEVAL ARCHITECTURE

- The Medieval period represent the religious architecture of Christianity and Islam as it took place during the Byzantine, Romanesque and Gothic periods.
- Byzantine architecture developed on the concept called the central church, assembled around a central dome.
- Romanesque architecture made remarkable achievement in the development of stone vaulted buildings.
- The Gothic period in architecture (AD1100-1500), churches were constructed with pointed arches, with ribs supporting masonry vaults.
- The arched ribs were supported by stone pillars strengthened by buttresses.
- These structures led to the development of the idea of the framed structure.

GENERAL OVERVIEW (ANCIENT – MODERN PERIOD)

H. RENAISSANCE ARCHITECTURE

- Renaissance means “rebirth” - a French translation of an Italian word ‘rinascita’.
- It was the revival of the old style (classical) of art and architecture and literature during the renaissance period (AD1500-1700).
- There was upsurge of interest in classical learning and values, and revival of naturalism.
- Proportioning was seen as the predetermining factor of beauty.
- Leon Battista Alberti (1401-1472) defined beauty in architecture as a harmony of all parts in whatsoever subject it appears, fitted together with such proportion and connection that nothing could be added, diminished or altered, but for the worse.
- A relationship between architectural proportion and renaissance pictorial device of perspective was formulated by Fillipo Brunelleschi (1377-1446) during this period.
- Piero della Franscesca defined perspective as objects seen from afar in proportion to their repetitive distance.

GENERAL OVERVIEW (ANCIENT – MODERN PERIOD)

I. MODERN ARCHITECTURE

- The period from AD1750 onwards is known as the period of modern architecture.
- Modern architecture can be classified into two kinds;
  i. Vernacular architecture conforms closely to the traditional way of design.
     - It is characterized by minimum of creativity and originality.
     - Masons and carpenters are experts in constructing such type of buildings without any guidance from architects or other building professionals.
  ii. Designed architecture is the result of a conscious effort to create something new.
     - Function, form and feeling for utility and aesthetics are the three considerations in designed architecture.

J. FACTORS THAT LED TO BIRTH OF MODERN ARCHITECTURE

- Industrial revolution of the 18th century brought about a change in the traditional style of living.
- Wealth also changed hands bringing into existence a new elite class with new tastes.
- Buildings were needed for factories, schools, offices, hospitals, airports, residences, etc.
- Man realized the futility of meaningless ornamentation of buildings, the traditional styles and orders of architecture.
- The economic depression caused by the First World War, brought about the need and importance for functional planning.
- The development and use of reinforced concrete (RC) in construction triggered the rapid development of modern architecture.
- Functional structure with RC columns, beams, and slabs were found to be economical owing to the increased speed of construction and proper utilization of space.
- Architects got more freedom to plan buildings suitable for various purposes and environments.

GENERAL OVERVIEW (ANCIENT – MODERN PERIOD)

K. VIEWS OF MODERN ARCHITECTS ON ARCHITECTURE

- **Auguste Perret, a French architect says "an architect is a poet who thinks and speaks in terms of construction.**
- **Louis Sullivan defined architectural design as "the architects graphical solution of a project or programme economically, structurally and aesthetically".**
- **Vitruvius, an architect and Roman writer in his De Architectura Libri Decem (Ten Books on Architecture) stated that the principles and requirements of good architecture are "utilitas" – utility (good planning), "firmitas"-sound construction, and "venustas" – pleasing appearance.**
- **Frank Llyod Wright defined modern architecture as "power" i.e. material resources directly applied to purpose.**
- **Le Corbusier defined architecture in terms of light and shade. He said "architecture is the masterly, correct and magnificent play of masses brought together in light. Our eyes are made to see forms in light. Thus cubes, cones, spheres, cylinders or pyramids are the great forms which light reveals to advantage. They are not only beautiful forms, but the most beautiful forms".**
- **He also stated that "architecture does not exist; only function exists".**

EGYPTIAN ARTS AND ARCHITECTURE (5000-30BC)

A. INTRODUCTION

- It involves the buildings, sculpture, painting and decorative arts of Ancient Egypt from about 5000BC to the conquest of Egypt by Rome in 30BC.
- Egyptian architecture were made to serve a purely religious purpose. That is;
  - Temples were decorated with paintings and filled with statues of gods and kings, in the belief that doing so served the gods and was a sign of devotion to the king.
  - Palaces were built for the worship of the kings and to serve as his dwelling place as well as for public administration.
  - Tombs were built to ensure the enjoyment of dead kings in their life after death.
  - Jewelry and amulets (charms) were worn not only for decoration but as protection against harm.
- Therefore, architecture cannot be devoid of the culture and tradition of the people.
- Egyptian arts and architecture were not for all Egyptians but only for kings and members of the ruling elites, and also for the gods.

B. ARCHITECTURAL INFLUENCES

- Ancient Egyptian architecture was an offshoot of various environmental influences which include;

(i). Historical

- Oldest and most ancient civilization.
- Information about Egyptian civilization is derived from:

B. ARCHITECTURAL INFLUENCES (contd)

(i). Historical (contd)

a. ancient literary sources,
b. records of papyri and tablets through archaeology.
c. archaeological study of Egyptian buildings and their inscriptions
d. stelae (slab used in the ancient world primarily as a grave marker but also for dedication, commemoration and decoration).

- Social life in Egypt was determined by the dictatorial rule of the pharaoh (his court, officials and priesthood) at one end of the scale and the strenuously-toiling peasants at the other.
- He employed large staff of trained craftsmen, and levied vast armies of labourers for the erection of monumental buildings primary of which is the pyramids.
- The labourers are probably motivated by a deep faith in the divinity of their leaders and a belief in immortality.
- They also thought that their contributions would improve their own prospects at the final judgment in the afterworld.
- Captives and foreigners) were also employed in public works (Ex.1:9-14).

(ii). Religious

- There is a close connection between religion and architecture, for the priesthood was powerful, invested with unlimited authority and equipped with all the learning of the age.
- The traits of the Egyptian religious rites were reproduced in their architecture.
- There were cults of many gods representing natural phenomena and the heavenly bodies, such as the sun, moon and stars, and by the worship of animals as personification of gods.

B. ARCHITECTURAL INFLUENCES

(ii). Religious (contd)

- They believed in life after death.
- Thus, they erected such everlasting monuments as pyramids for the preservation of the dead.
- The earthly dwelling residence was regarded as a temporary lodging, and the tomb as the permanent abode.
- The pharaohs were seen as gods divine representatives on earth.
- After death, they became immortal, joining the gods in the afterworld.
- Egyptians also believed that the body and soul were important to human existence, in life and in death e.g. their funerary practices, such as mummification and burial in tombs, were designed to assist the deceased find their way in the afterworld.
- Egyptians believed that only the souls of kings went on to enjoy life with the gods and not the souls of the nobles, which continued to inhabit the tomb and needed to be nourished by daily offerings of food and drink.
- To encourage the soul to return to the body, the body was preserved and a statuette in the likeness of the deceased was placed in the tomb.
- Statuettes called shabti or shawabti, (slaves for the soul) were also placed in the tombs to perform work on behalf of the deceased in the afterlife.
- The tombs were filled with food, tools, domestic wares, and treasures (all the necessities of life) to ensure the soul's return to the body so that the deceased would live happily ever after.

B. ARCHITECTURAL INFLUENCES (contd)

(iii). Climatic

- Equable and warm i.e. no snow and frost; rainfall is rare; all these conditions contributed to the preservation of ancient Egyptian monuments.
  a. Roof drainage was not an important consideration, thus flat roofs of stones were used to cover the buildings, excluding the intense heat in the process.
  b. No real need for windows, thus massive walls were used.
  c. The massive walls also protect the interior from the fierce heat of the sun, and It provided an uninterrupted surface for hieroglyphics
  d. Brilliant sunshine enabled sufficient light to reach the interior of temples through doors and roof slits.

(iv). Geographical

- Egypt is situated along the banks of the Nile River which divides to form outlets to the Mediterranean Sea at the north and to the Red Sea at the east.
- The two seas served as inlets and outlets for both western and foreign trade, and as an unfailing means of communication.
- The Nile turns desert sands into fruitful fields for a predictable agricultural system, thus it afforded a stability of life in which arts and crafts readily flourished.
- Therefore, the banks of the Nile River became the site of their villages, cities and cemeteries.
- Equally, the deserts and the seas, which protected Egypt on all sides, contributed to its stability by discouraging serious invasion for almost 2000 years.

B. ARCHITECTURAL INFLUENCES (contd)

(v). Geological

- Building materials that were abundantly available in Egypt are:

a. Stone

- People live in river mud houses except in rare cases of stone being more readily available.
- Even pharaohs lived in brick palaces and rock was reserved for the dead and the gods.
- Egyptian monuments have remained lasting largely due to the durability of the materials.
- Egyptian architecture was made possible not only by the materials, but also by the methods of quarrying, transporting and raising enormous blocks of stone into position.

b. Sun-dried Bricks

- Tombs and temples were constructed of stone while domestic buildings were built with sun-dried bricks.
- The sun-dried bricks were strong and lasting (i). when protected against the weather on the external face; (ii). groundwater did not dissolve or flood their foundations .
- The bricks were 300-450mm in length and 150-200mm in width.
- Five days' work would make about 5000 bricks needed for a worker's one storey house of 60-80m^2 with 400mm thick walls.

c. Reeds and Palm-leaves

- Used to frame or reinforce mud-brick constructions (wattle and daub), or as mats for panels, partitions and fences.

d. Mortar

- The ancient Egyptians did not know the hard setting lime plaster invented by the Greeks, but used instead a mixture of gypsum and quartz with small amounts of lime.

B. ARCHITECTURAL INFLUENCES (contd)

(v). Geological (contd)

d. Wood

- Doors and shutters were made of it and upper storey floors.
- The longest beams that could be cut from local wood were only three to four meters long.
- If the ceiling was wider than that, it had to be supported with wooden pillars.
- When a building was abandoned, all wooden and stone parts were removed to be reused somewhere else.

C. ARCHITECTURAL CHARACTER

- Domestic architecture consisted of papyrus and palm-branch ribs, plastered over with clay.
- Wall or fences were made by stacking vertically, bundles of stems side by side, tied together by another bundle placed horizontally near the top.
- Alternatively, palm-leaf ribs were planted in the ground at short intervals, with others laced in a diagonal network across them, and secured to a horizontal member near the top; the whole being daubed with mud afterwards.
- Sun-dried mud bricks were also used as walling material.
- The walls were made to diminish course by course towards the top for stability.
- The inner face of the wall remained vertical for ordinary convenience, while it was the outer face which tapered upwards.
- Vaulting was introduced but never used in monumental stonework till the advent of the Romans.
- Egyptian columns have a distinctive character derived from vegetable origin; their shafts indicative of bundles of plant stems, gathered-in a little at the base, and with capitals seemingly derived from the lotus bud, the papyrus flower or the ubiquitous palm.
- Egyptian monumental architecture is essentially a columnar and trabeated style.

D. ARCHITECTURAL TYPOLOGY

- Three principal building types: tomb, temple and domestic architecture.

Tomb Architecture

- Highly developed and often grandiose.
- The tomb not only protected the corpse from desecration but also provided it with materials to ensure continued existence after death.
- Tombs were of three main types namely; Royal pyramids, Private tombs (tombs of the elites) and Rock-cut tombs.

a). Royal Pyramids

- The royal pyramids were elaborate structures with important religious purposes such as:
  i. Belief in life after death: they use every means at their disposal to build lasting tombs, to preserve the body, and to bury with it the finest commodities that might be needed for the sustenance and eternal enjoyment of the deceased.
  ii. Located on the west side of the Nile River: Because the sun sets in the west, Egyptians believed that to be the entrance to the world where the dead dwells.
  iii. Orientation of the pyramids is east - west which paralleled the day time course of the sun as it rises and sets.
  iv. Height of the pyramid was meant to take away the breath of the onlooker and cause him to tremble and to impress them with the ruler's god-like strength.

a). Royal Pyramids (contd)

- The gigantic pyramids were conspicuous targets for tomb robbers.
- Therefore, generations of kings hid their tombs in the Valley of the Kings in an attempt to elude the robbers.
- Despite efforts to hide the entrances, thieves managed to find the tombs, pillaging and emptying them of their treasures, jeopardizing the hope for eternal life.
- The tombs consisted of a series of corridors, steps and rooms that ended in a burial chamber.
- The door from the tomb formed a point of transition from the world of the living to the world of the dead.
- A stelae marked the entrance of the tomb and bore the name of the royal occupant.

Stages of Evolution of Egyptian Tomb Architecture

- 1st Dynasty Kings (2920-2770 BC) were buried in cemeteries built of sun-dried mud bricks (mastabas).
- The first pyramid (Step pyramid) was introduced during the 3rd Dynasty of kings (2649-2575BC) by Architect Imhotep and was built of stone for King Djoser (Zoser).
- It consisted of six huge, square tiers (steps) of decreasing size, placed one on top of each other to a height of 60 meters.
- Similarities show that the step pyramidal tomb is an elaboration of the original mastaba tomb type.
- The most monumental of the royal pyramids are: the Step Pyramid of Djoser, Saqqara and the Three Pyramids of Giza.

a). Royal Pyramids (contd)

Plate 1: Step Pyramid of Djoser

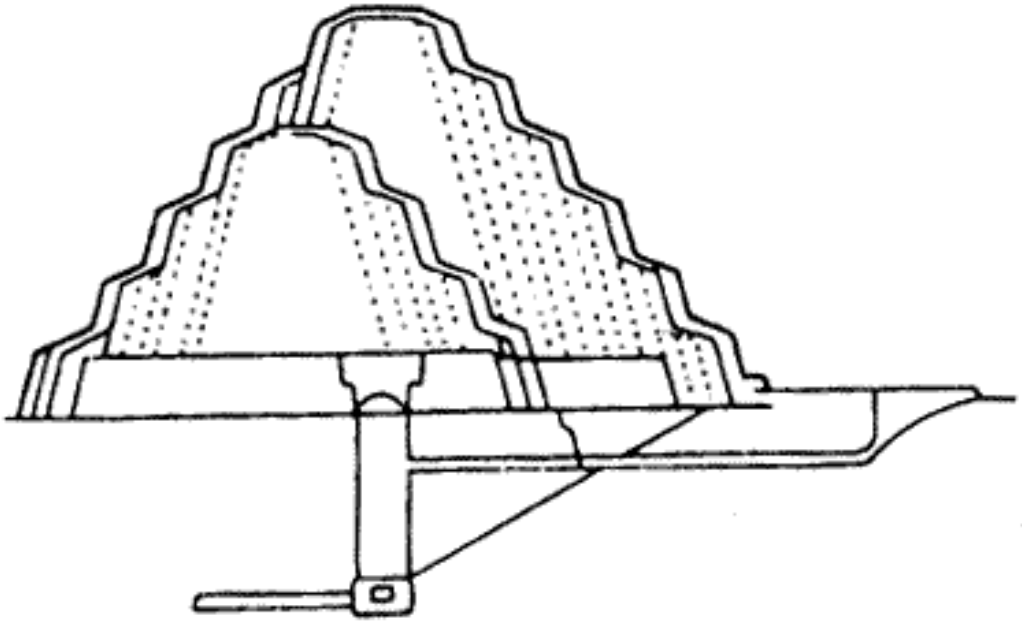
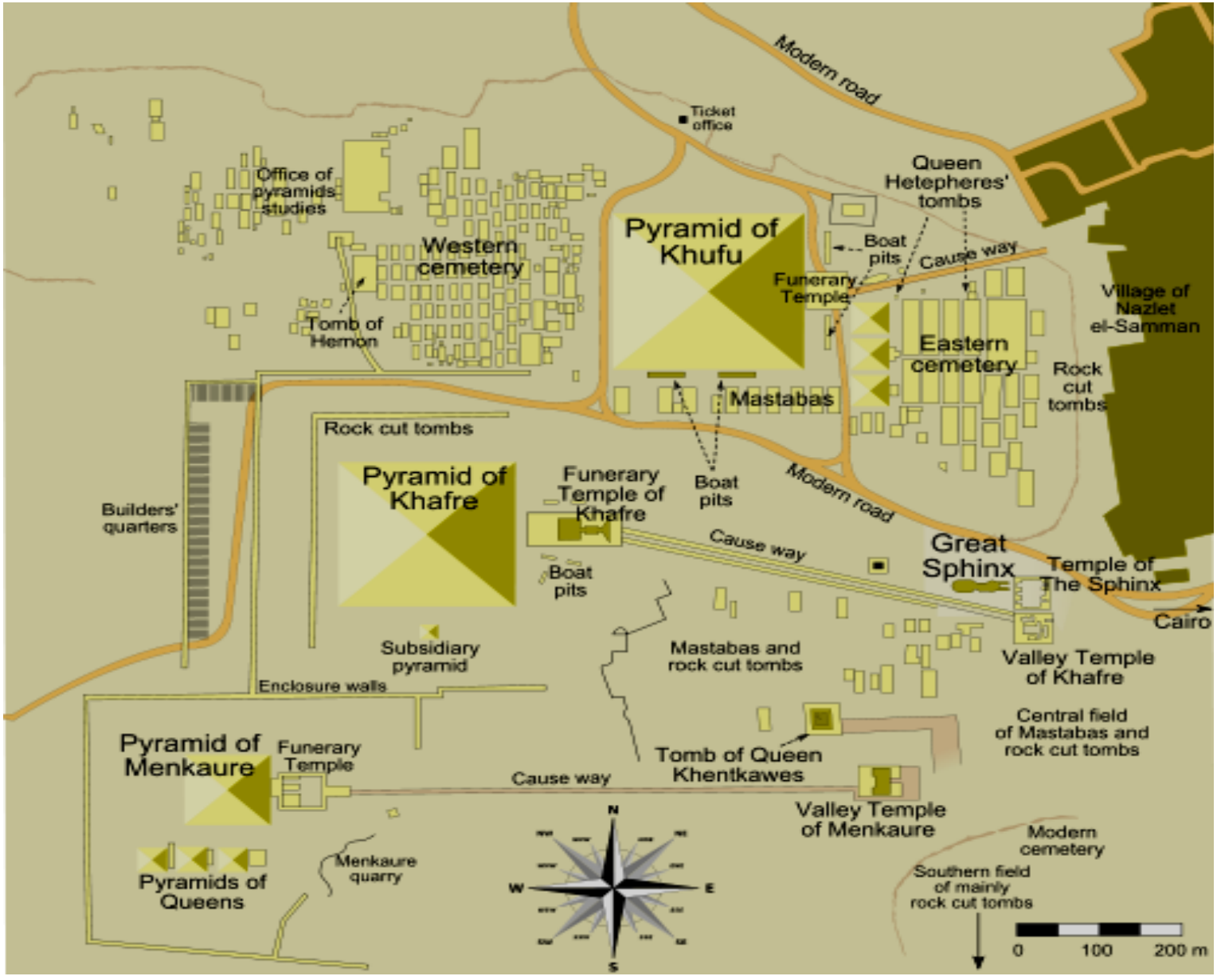


Fig. 1: Vertical Section through the Step Pyramid

THE THREE GREAT PYRAMIDS OF GIZA

- **Located at the city of Giza, a necropolis (cemetery) of ancient Memphis, presently part of Greater Cairo, Egypt.**



Map of Giza Pyramid Complex

THE THREE GREAT PYRAMIDS OF GIZA

A. History

- The three great pyramids of Giza consist of the pyramids for Kings Khufu (Cheops), Kherfe (Chepren), and Menkaure (Mykerinos).
- The Great Pyramid of Khufu is listed as one of the Seven Ancient Wonders, yet it's the only surviving.
- Built by Pharaoh Khufu of the 4th Dynasty around 2560BC to serve as a tomb when he dies.
- The second pyramid belongs to the pharaoh Kherfe and it is 3 meters shorter than Khufu's.
- The pyramid of Menkaure is the smallest of the three pyramids (66 meters high).
- The Three Great Pyramids are now enclosed and serves as a tourist region of the Giza plateau.
- The enclosement also contains a museum housing the mysterious Sun Boat.
- The boat is believed to have been used to transport the body of Khufu to his burial place in the pyramid.
- It is also believed that the boat served him as a means of transportation in his after life journey to the world beyond.

THE THREE GREAT PYRAMIDS OF GIZA

All Giza Pyramids

THE THREE GREAT PYRAMIDS OF GIZA

B. Case Study - The Great Pyramid of Khufu

- 145 meters high when it was built but has lost 10m off its top.
- world's tallest structure for more than 43 centuries until advent of modern architecture in the 19th century.
- covered with white 'casing stones' of highly polished white limestone which caused the monument to shine brightly in the sun, making it visible from a considerable distance.
- The sloping angle of its sides is 51 degrees to the horizontal.
- Each side is oriented with one of the cardinal points of the compass i.e. north, south, east and west.
- The horizontal cross-section of the pyramid is a square at any level, with the square at the base measuring 229m x 229m.
- Each stone weighed between 2000kg (2 tons) and 5000kg (5 tons) and consists of approximately 2.5 million blocks of limestone.
- The granite stones for the King's Chamber were imported from Aswan (800km away) and limestones from Tura (14km away).
- It's estimated that the Great Pyramid of Khufu took almost 20 years to complete, due to its size and location of stone used in construction of the structure.
- It takes ages for stone masons to cut and shape each block.
- All these complicated tasks made the pyramid difficult to construct, but the results were amazing.
- It is suggested that the stone blocks in the pyramid are enough to construct a 3m high, 300mm thick wall around France.

THE THREE GREAT PYRAMIDS OF GIZA

B. Case Study - The Great Pyramid of Khufu

- The entrance to the pyramid is on the north façade.
- There are a number of corridors, steps and galleries that leads to the king's burial chamber.
- The king's chamber is located at the heart of the pyramid accessible through the Great Gallery and an ascending corridor.
- The king's sarcophagus (a stone coffin usually with carvings) is made of red granite, including the interior walls of the chamber.
- All the interior stone blocks fit so well that a card won't fit between them!!!

THE THREE GREAT PYRAMIDS OF GIZA

B. Case Study - The Great Pyramid of Khufu

Entrance to Interior Passage

THE THREE GREAT PYRAMIDS OF GIZA

C. How were the Pyramids Built?

- The construction of the pyramids has been a puzzle to scientists for centuries.
- No clues have given archaeologists answers about the construction of the pyramids.
- Evidence have it that the site was first prepared, and stone blocks were transported and placed.
- However, it is not known how the stone blocks were transported and placed.
- Built by labourers as a kind of tax that had to be paid by everyone supervised by skilled artisans
- Construction took place during 3-4 months of the year when the Nile was flooded.
- Several theories have been proposed on how the pyramids were constructed.

Theory 1

- The most common theory for moving the large stone blocks was to slide logs under them to make mobility easier.
- Strong ropes were used to pull the stone blocks with several people pushing the block forward, while several men would remove the last log uncovered by the stone.
- The end log removed was then transferred to the front where it would complete the cycle under the stone, until it went to the back again.
- Moving the block was one challenge, pacing it into position was a greater one.

Theory 2

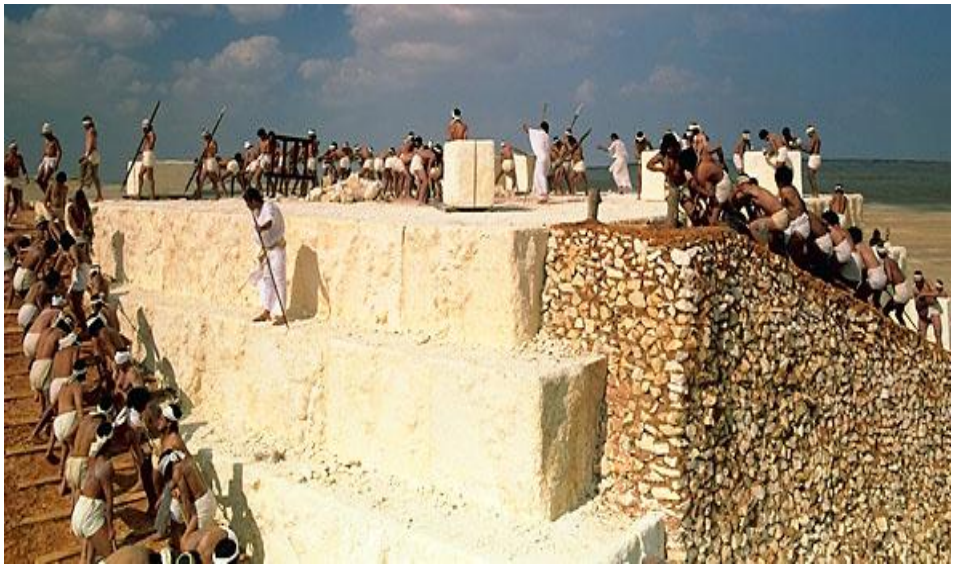
- The most common theory for placement of each stone is to have a ramp (straight or spiral) that went right around the pyramid's sides that was raised as the construction proceeded.
- The ramp is believed to have been coated with mud and water to ease the movement of the stone blocks as they were pushed or pulled (or both).

THE THREE GREAT PYRAMIDS OF GIZA

Stone block on sled

Pouring water to lubricate the ramp

Ramp Up Pyramid



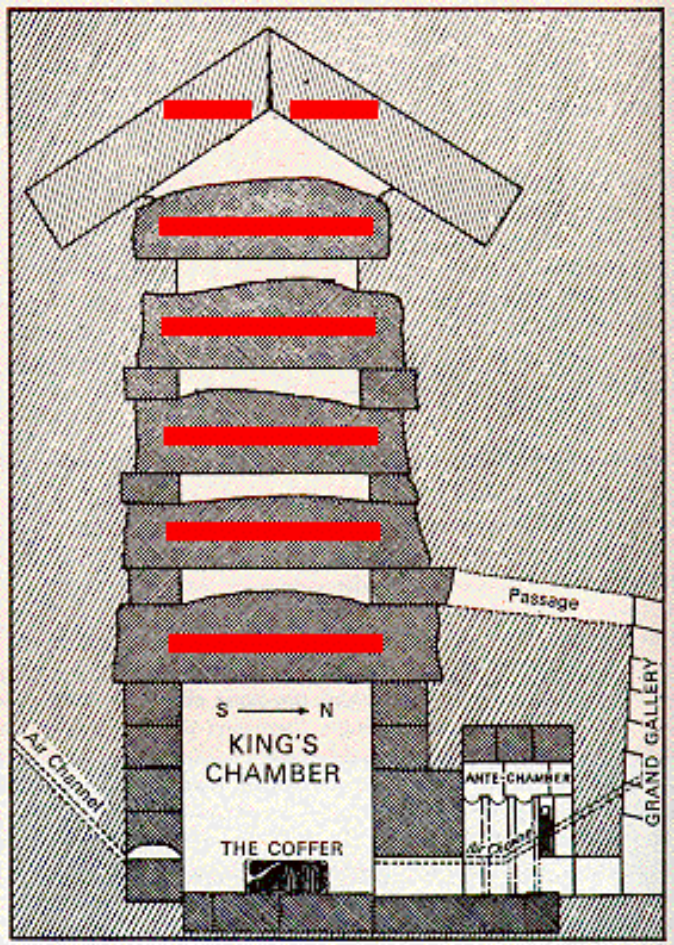
Re-enactment of Pyramid Construction

THE THREE GREAT PYRAMIDS OF GIZA

D. The Pyramids Interior

i. King's Chamber

- The chamber is about 5.25m x 10.5m x 6m tall, and was built with solid stone blocks of granite that weighs about 50,000kg.
- Consists of a sarcophagus (2.1m x 900mm) with smooth walls and polished ceiling.
- Floor is about 60sqm, made with blocks of pink Aswan granite transported from Aswan from the south.
- Archaeologists concluded that the sarcophagus was built inside the pyramid because it would have been almost impossible to transport such a heavy stone structure in such a confined and narrow passage.



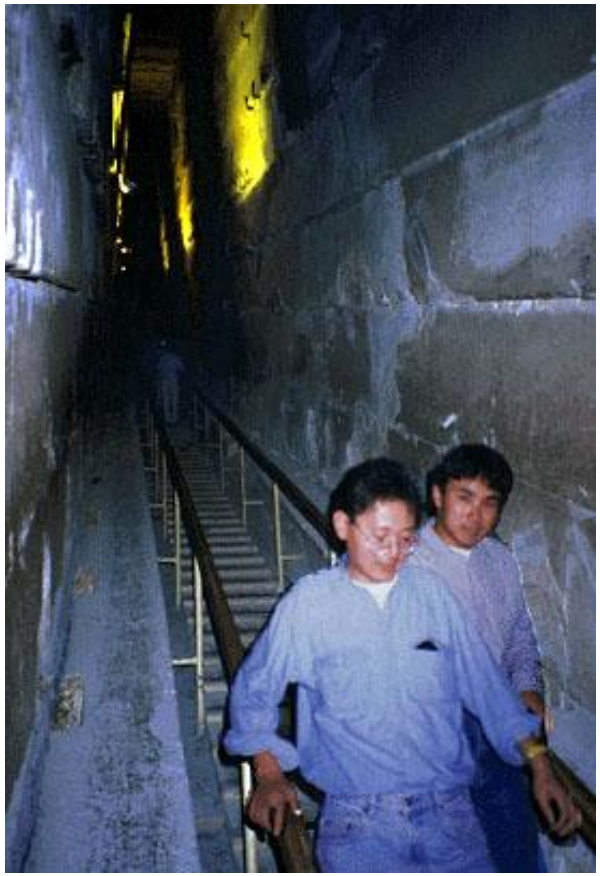
Vertical section of King's Chamber Complex (looking west). Crossed lines indicate granite; single lines limestone.

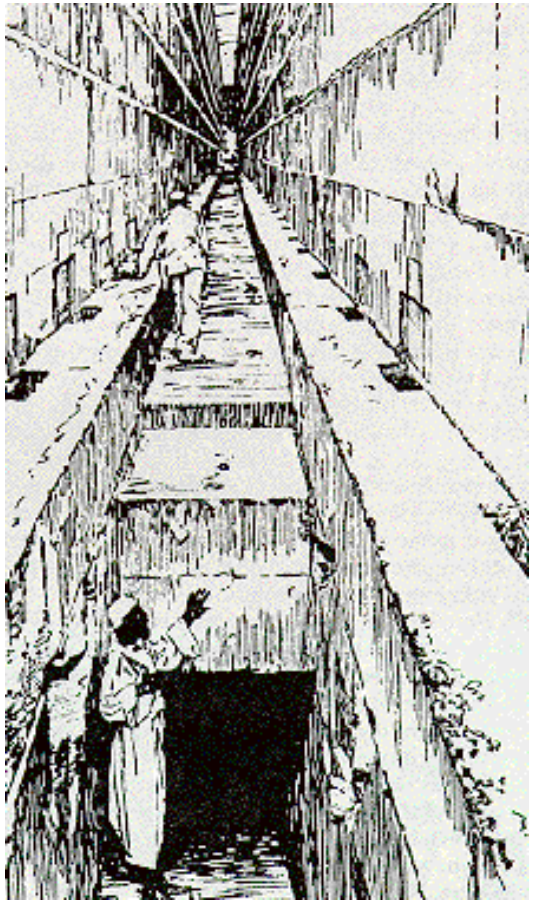
Vertical Section of King's Chamber

THE THREE GREAT PYRAMIDS OF GIZA

ii. Grand Gallery

- It rises gradually to the king's chamber with a stepped hall.
- The hall is 48m long, 3m wide and 11m high and 26 degrees to the horizontal.
- The walls were made of polished stone with roofing that overlaps stone blocks to create a stepped effect.
- These were thought to be a ramp for large giant blocks to seal the pyramid for eternity.
- The bottom of the gallery hall as an entrance to the Queen's chamber; and at the top of the hall is an entrance to the king's chamber.





THE THREE GREAT PYRAMIDS OF GIZA

ii. Queen's Chamber

- Located under the king's chamber and the smallest of the three.
- Its name has falsely led people into believing that this room held the mummy of a queen.
- The true purpose of the chamber, however, remains uncertain.
- The chamber is closed to public and cannot be accessed by tourists for viewing.
- It measures approximately 5.74 by 5.23 meters, and 4.57 meters in height.

iii. Underground Chamber

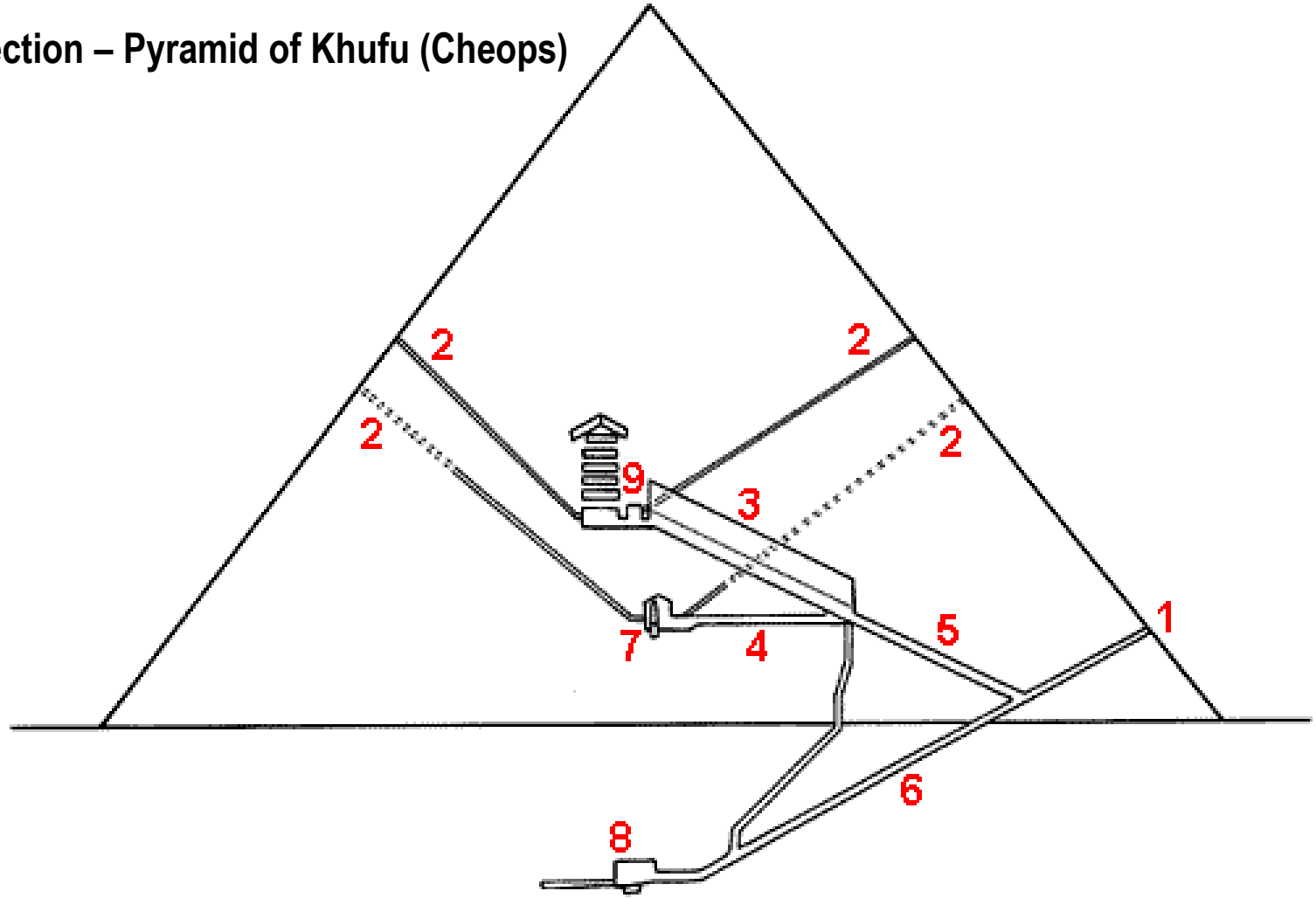
- The oldest chamber in the pyramid.
- The largest of the three, never fully completed and has very little oxygen.
- The low oxygen level makes it impossible to burn lanterns and make it very difficult to breathe.

iv. Shafts

- They are believed to allow air to proceed into the king's chamber.
- Also believed to lead to the path of the star, which allows the pharaoh's soul to escape to the after life.
- Extends about 145m outward and travel in a sloping path.

THE THREE GREAT PYRAMIDS OF GIZA

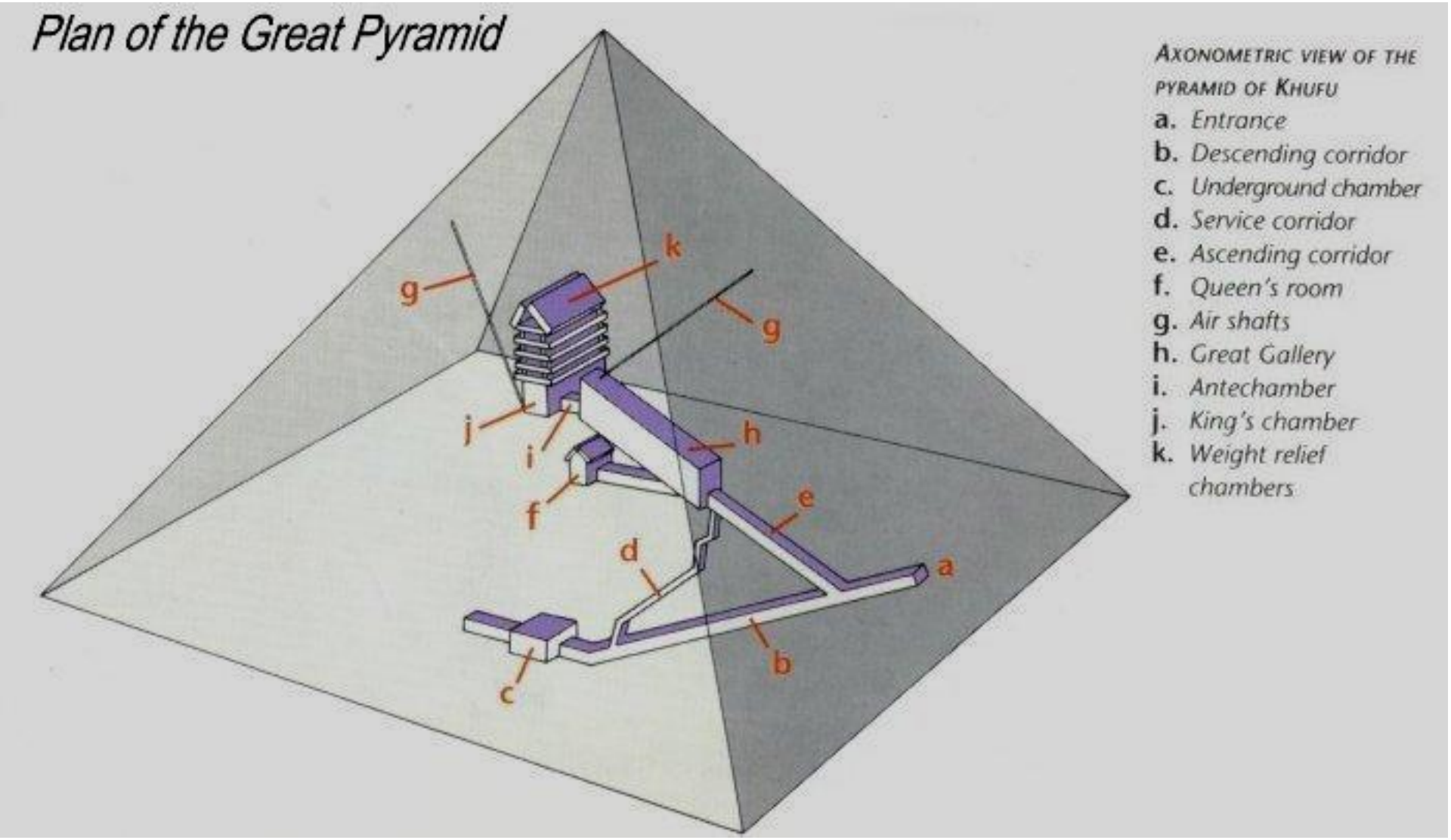
Cross Section – Pyramid of Khufu (Cheops)



1. Entrance
2. Air Shafts
3. Grand Gallery
4. Horizontal Passage
5. Ascending Passage
6. Descending Passage
7. Queens Chamber
8. Underground Chamber
9. King's Chamber

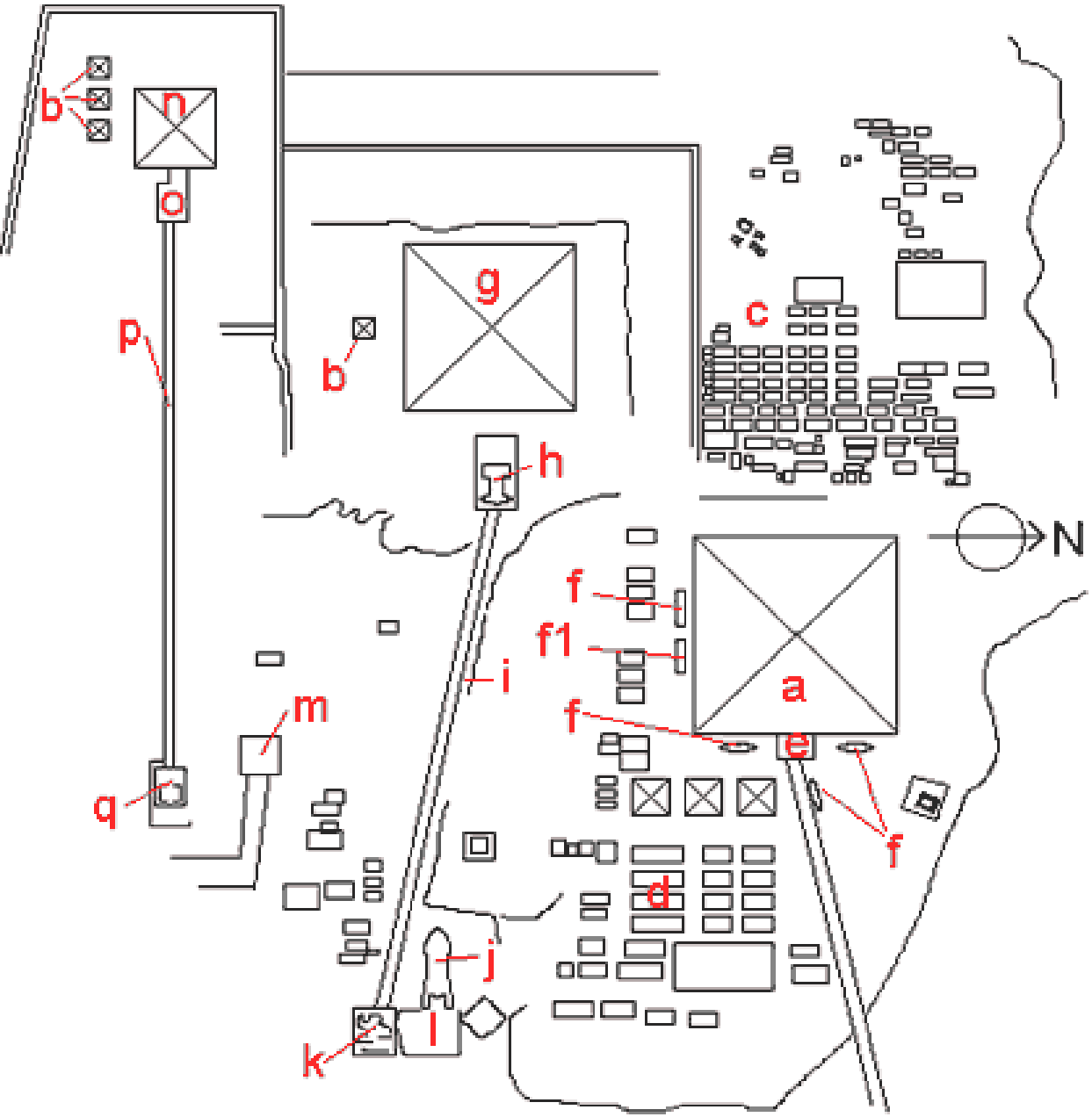
THE THREE GREAT PYRAMIDS OF GIZA

Axonometric View of the Pyramid of Khufu (Cheops)



THE THREE GREAT PYRAMIDS OF GIZA

Pyramids of Giza Complex



a. Pyramid of Khufu (Cheops)
b. Queens' Pyramid
c. Western cemetery
d. Eastern Cemetery
e. Remnants of the Valley Temple of (Khufu) Cheops
f. Pits for the Solar Ships
g. Pyramid of Khefre (Chepren)
h. Mortuary Temple of Chepren
i. Causeway
j. Sphinx
k. Valley Temple of Chepren
l. Sphinx Temple
m. Monument of Queen Chentkaue
n. Pyramid of Menkaure (Mykerinos)
o. Mortuary Temple of Mykerinos
p. Remnants of the Causeway
q. Remnants of the Valley Temple

THE THREE GREAT PYRAMIDS OF GIZA

The Sphinx Against Khafre's Pyramid

The Great Sphinx at Giza, Egypt

Great Pyramids of Giza

SPHINX MYTHOLOGIES

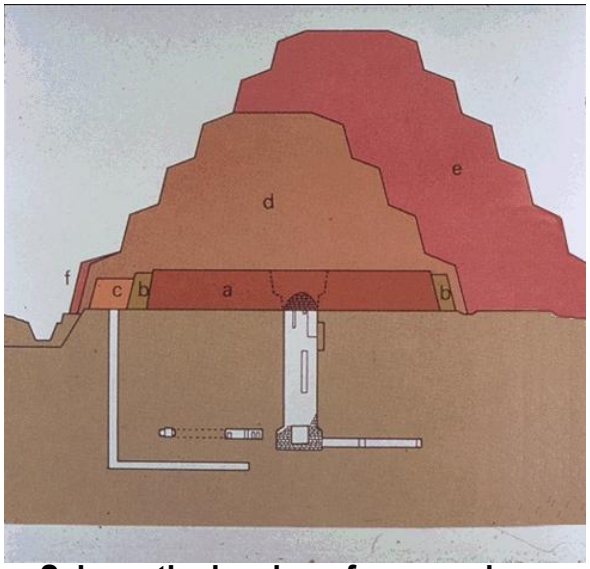
- **EGYPTIAN**
- Seen as a guardian deity.
- Represented with the body of a lion and head of a ram or a man, frequently a likeness of the reigning pharaoh.
- The Great sphinx is about 20m high and 73m long.

- **GREEK**
- Monster with the head and breasts of a woman, the body of a lion and the wings of a bird.
- Lying on a rock at the entrance to the city of Thebes asking all coming into the town a riddle;
- **"WHAT IS IT THAT HAS 4 FEET IN THE MORNING, 2 AT NOON AND 3 AT NIGHT"?**
- If they could not solve the riddle, she killed them.
- Oepidus solved the riddle and the Thebians made him their king and the sphinx killed herself.
- **Ans: "A MAN,** who crawls on 4 limbs as a baby, walks upright on 2 legs as an adult, and walks with the aid of a stick in old age".

The Step Pyramid Complex of Djoser

- Built during the 3rd Dynasty (c. 2800 B.C.) in Saqqara, Egypt by Djoser about 2737-2717BC, necropolis of the capital Memphis.
- Considered the first monumental royal tomb and one of the oldest stone structures in Egypt.
- Designed by Imhotep, the first known Egyptian architect who was later deified by the Egyptians.
- Characterized by a flat-topped rectangular super-structure of stone with a shaft descending to the burial chamber far below it.
- After completion, its height was increased by building additions of diminishing size superimposed on each other.
- Thus Djoser's original mastaba became a terraced structure rising in six unequal steps to a height of 60m, with base measuring 120x108m.
- The substructure has an intricate system of underground corridors and rooms.
- Its main feature is a central shaft 25x8m wide at the bottom of which is the sepulchral chamber.

Stepped Pyramid and Heb-Sed Court

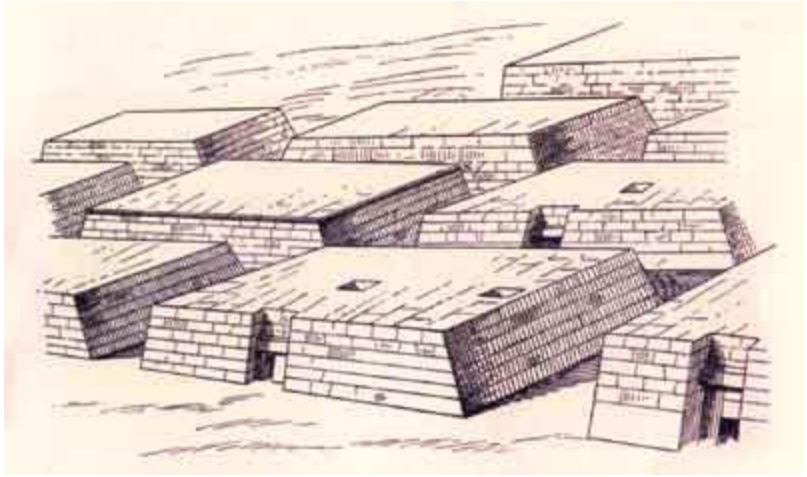


Schematic drawing of successive Step Pyramid Construction stage

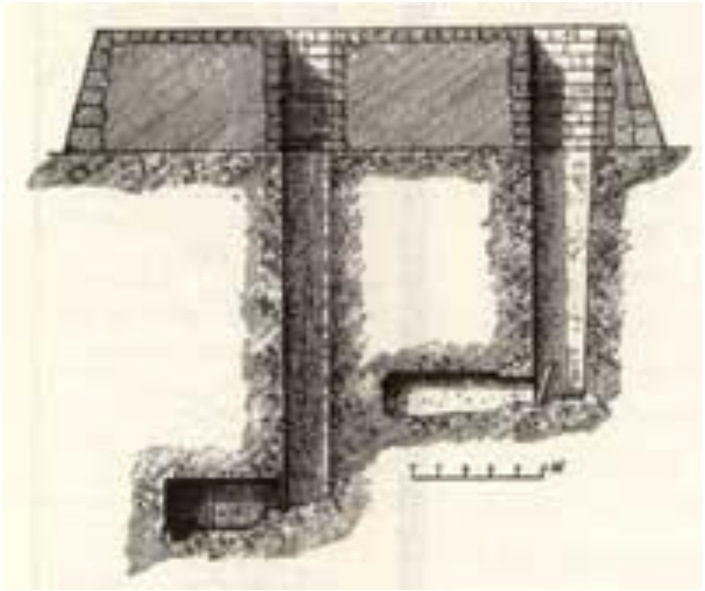
b. Private Tombs or Tombs of the Elites (Mastabas)

- **Less elaborate than the royal tombs, nevertheless impressive.**
- **Probably given as rewards by the Pharaoh since it was a privilege to be buried near the Pharaoh.**
- **Courtiers and families of the monarch were also buried in these structures.**
- **Like the pyramids, they were built on the west side of the Nile (symbol of death).**
- **The deceased were laid to rest in an underground chamber at the bottom of a shaft, and a flat-topped tomb was placed over them.**
- **1st Dynasty (2920-2770BC) private tombs consisted of mud brick underground structures that contained the burial site and a flat-topped rectangular, mud or stone superstructure built over it known as mastaba (Arabic for "bench").**
  - The mastaba tombs are so named because they resemble the benches outside shops in the markets.
- **2nd and 3rd Dynasties private tombs, "stairway" mastaba was introduced with the tomb chamber having been sunk much deeper and cut in the rock below.**
  - Steps and ramps led from the top of the mastaba to connect with a shaft which descended to the level of the tomb chamber.
  - After the burial, heavy stone portcullises were dropped across the approach from slots built to receive them, and this was then filled in and all surfaces traces removed.
- **4th Dynasty private tombs (2575–2467BC), stone mastabas began to replace those of mud bricks.**
  - A small offering chapel developed, with an offering room constructed within the mastaba itself.

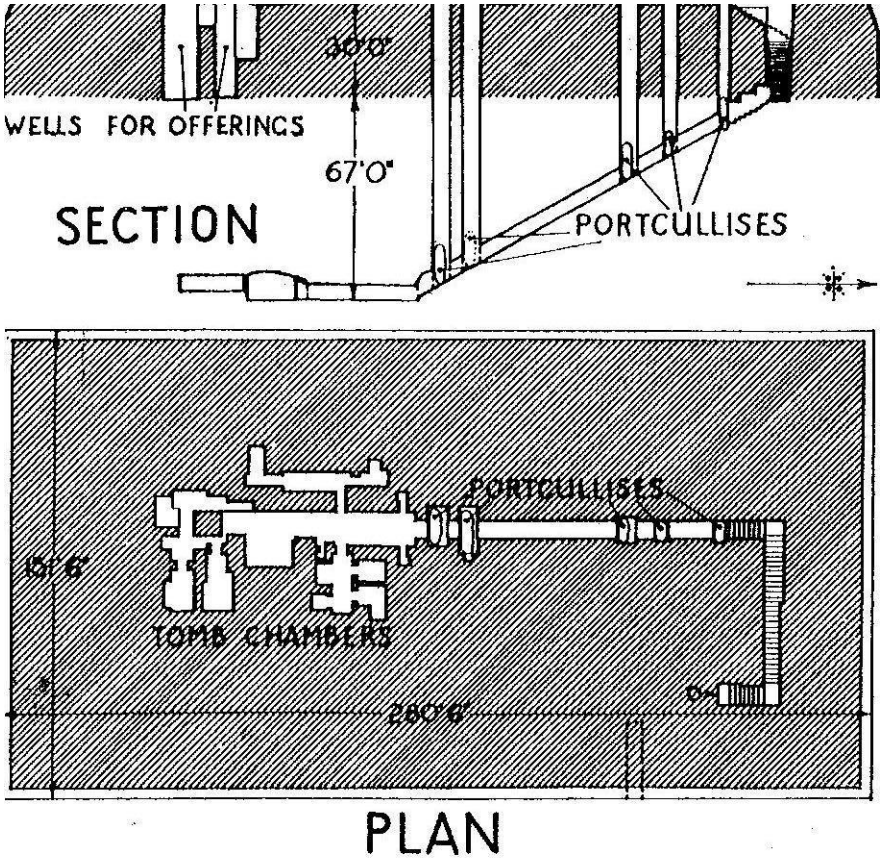
b. Private Tombs or Tombs of the Elites (Mastabas)



Mastaba Tombs



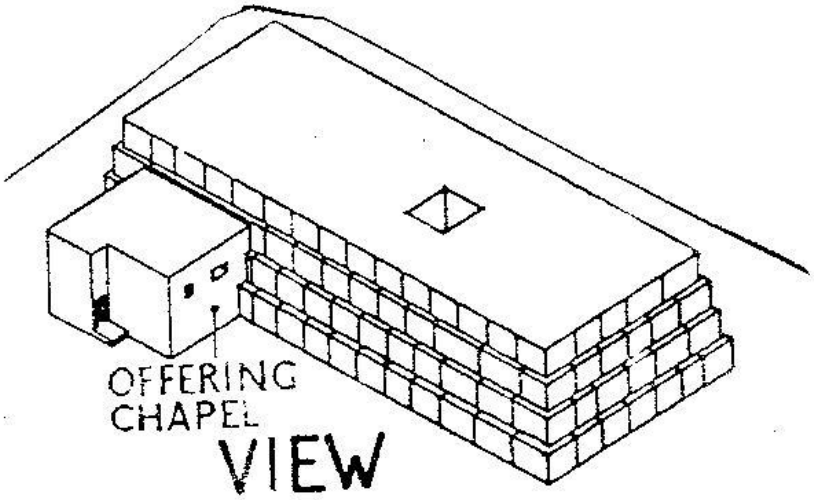
Vertical Section through Mastaba Tomb

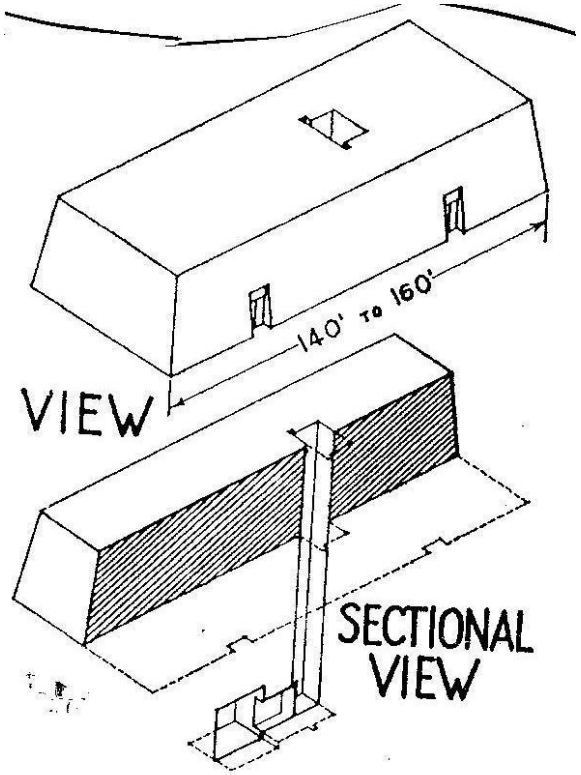


3rd Dynasty Mastaba

b. Private Tombs or Tombs of the Elites (Mastabas)

- **5th and 6th Dynasties (2465–2323BC and 2323–2125BC) respectively, larger mastabas of the highest officials had series of increasingly elaborate decorated rooms for performance of rituals.**
  - Rituals focused on false doors on the west wall which was intended to connect the worlds of the dead and the living.
  - The door was solid and impassible to the living, but permitted the dead to pass through and receive offerings.
  - In the offering room was a stelae on which the deceased was shown seated at a table of offerings.
  - The actual body of the dead was placed in a burial chamber at the bottom of a shaft cut deep into the ground below the chapel.
  - After the burial, the shaft was filled in and made inaccessible.





c. Rock-cut Tomb

- Rock-cut tombs are tomb chapels which were excavated into the rocky cliffs overlooking the Nile.
- Became the most common private tomb for the nobles in the Middle Kingdom.
- They were either simple single chambers serving all the functions of the multiplicity of rooms in a mastaba or consisting of huge halls, often connecting to form a labyrinthine complexes (system of intricate passageways and blind alleys that rendered egress difficult), with columns carefully cut from the rock.
- Chapels with false doors were carved out within the halls.
- The cutting is done with considerable architectural precisions.
- The tomb chapels were excavated to take a simple T-form, in which the cross-bar of the 'T' represents the entrance hall, and the upright stroke of the 'T' is the chapel proper.
- Example is the Tombs of the Kings, Thebes.

ii. Temple Architecture

- **Temples were places where the gods and their divine energy could reside, separated from everything else in the world.**
- **There are two principal kinds of temples:**

a. **cult temples -** for the popular worship of the ancient and mysterious gods; and

b. **funerary temples -** shrines for the funerary cults of dead kings.

- **Temple architecture began in the worship of multifarious local deities.**
- **The old or middle kingdom temples were built of perishable mud brick; only few have survived.**
- **In the 18th Dynasty, major temples were built of stones and form bulk of most surviving temples.**
- **The Egyptians believed that the gods occupied a different part of the universe.**
- **Temples were thus built as houses for the gods, where the gods appear on earth.**
- **Focal point of any Egyptian temple was a sanctuary area that contained a cult statue of the god.**
- **The statue, sanctuary and the temple were made as beautiful as possible so that the god would want to reside there.**
- **Most Egyptians never went inside the temples believing that the gods were different from human beings and that it was dangerous for humans to interact with gods unprotected.**
- **The spaces within the temple were believed to be sacred and became more sacred at the inner parts, restricted for kings and officiating priests.**

ii. Temple Architecture (contd)

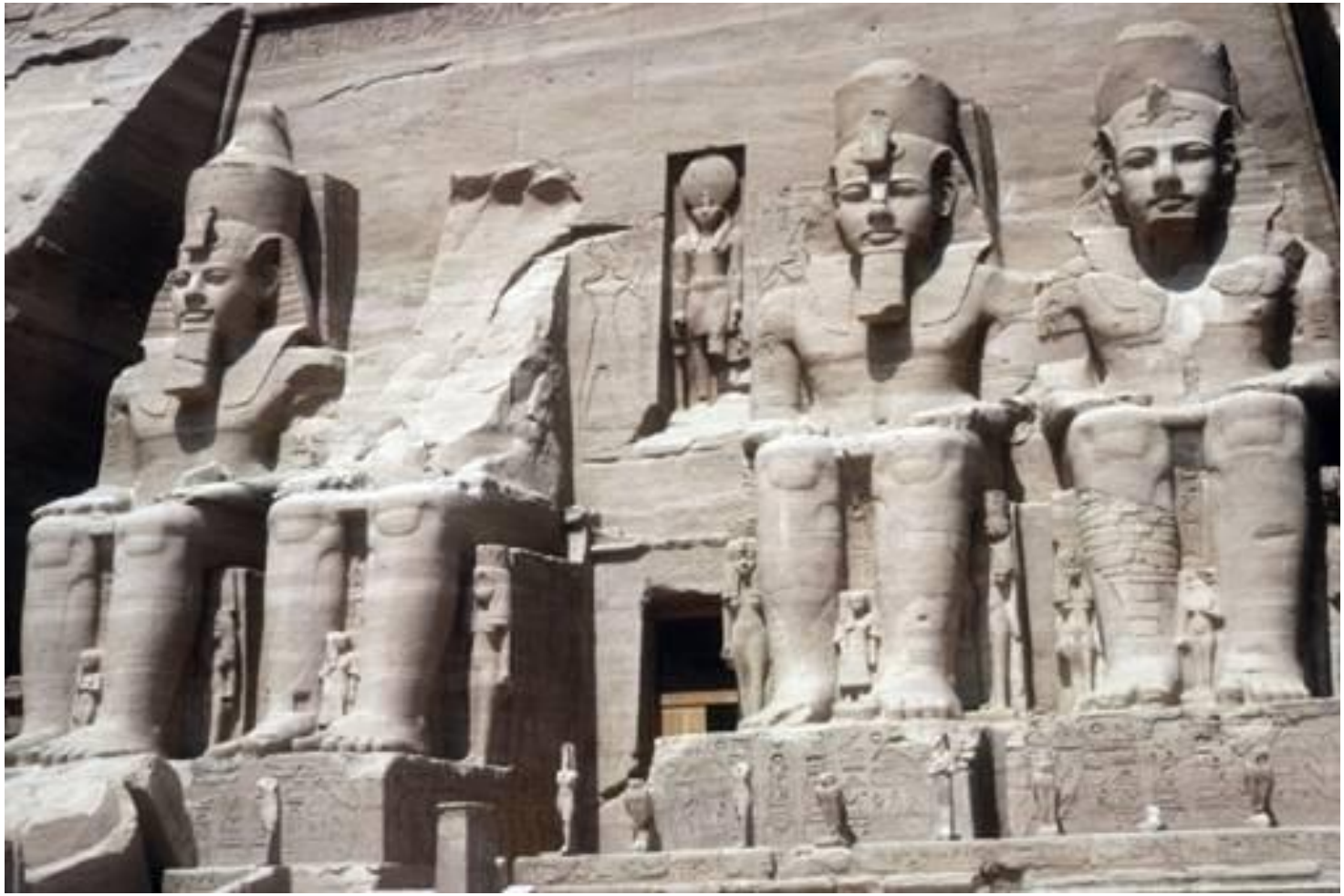
- The architecture of the temple was made to replicate the universe at the moment of creation.
- Egyptians believed that before creation, there existed only the dark, marshy primeval (relating to the earliest ages) waters of confusion.
- Out of these primeval waters (nun), a mound arose on which the creator god came into being and created the ordered universe.
- The dark hypostyle hall (interior space whose roof rests on pillars or columns) with its many pillars representing the primeval waters.
- The pillars topped by papyrus or lotus capitals represented the marshy plants.
- The polished floor represented the waters itself.
- The essential layout was a rectangular palisaded court (reception pavilion) entered from a narrow end connected by a corridor on a causeway to the open court of the temple within which stood the emblem of the deity.
- Inside the further end of the court was a pavilion, comprising vestibules and sanctuary.
- Fine relief embellished the covered corridor on both sides of the court.
- Procession was a common feature of the cult temples; hence free circulation was required through or around the sanctuary.
- Examples are the Temple of Hatshepsut, Der El-Bahari, Thebes (1520BC); the Great Temple, Abu-Simbel; the Great Temple of Ammon, Karnak, Thebes; the Ramasseum, Thebes (1301BC).

ii. Temple Architecture (contd)

Examples

Temple at Abu Simbel

Four colossal seated statues of Ramses II flank the entrance to the larger of the two temples carved into a sandstone cliff at Abu Simbel, Egypt, in about 1250 BC. Such large-scale projects as the construction of temples and pyramids were carried out by the general populace, and their work was treated as a form of taxation.



ii. Temple Architecture (contd)

Temple at Luxor

The ancient Egyptian temple at Luxor, on the east bank of the River Nile, was begun in the 1200s BC and was added to by each succeeding dynasty. It was connected to the temple at Karnak by a causeway about 3.5 km (2 mi) long, lined with hundreds of sphinxes. Once a year the image of the god Amon was transported by barge from Karnak to Luxor, as part of a huge festival.

Hypostyle Hall, Luxor Temple

Statue of Rameses II with Pillars of Luxor Temple

Pylon & Statue of Rameses II

ii. Temple Architecture (contd)

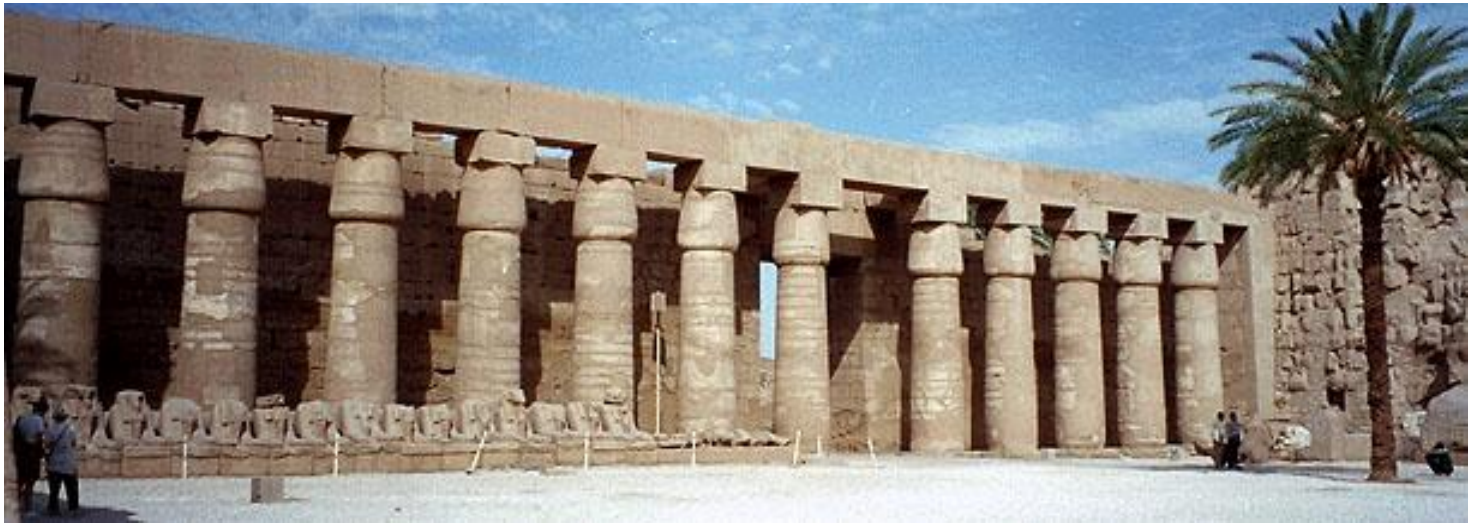
Temple at Karnak

The temple of Karnak was built on the Nile at Luxor by a succession of Egyptian rulers. It comprises a series of courts, monumental gateways, obelisks, and high perimeter walls.

Temple at Karnak showing the close relationship between Egyptian civilization and the Nile.

ii. Temple Architecture (contd)

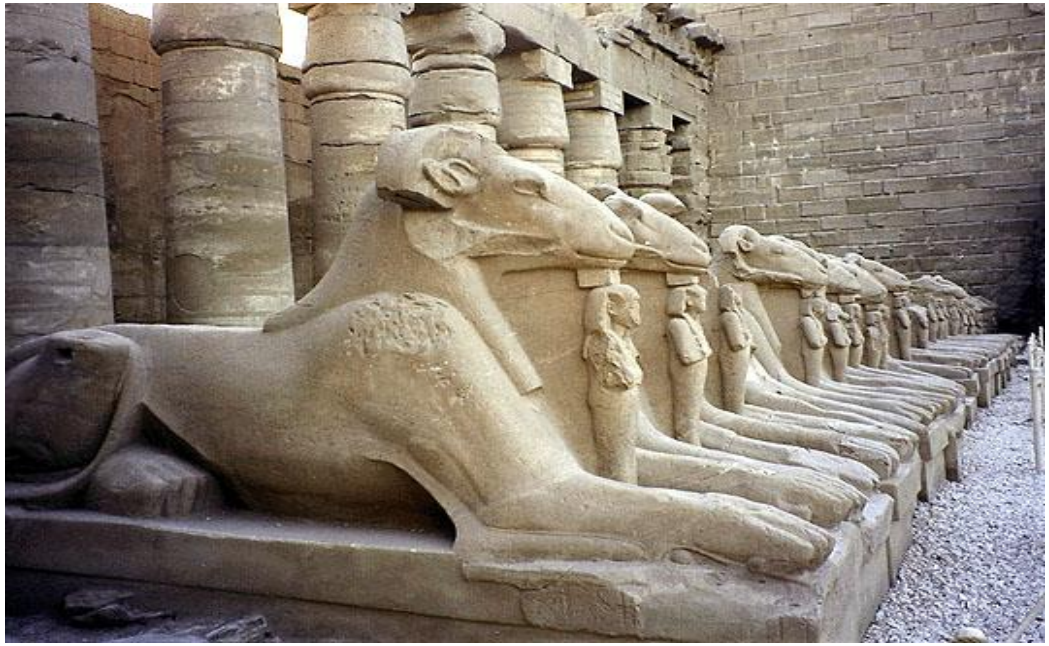
Temple at Karnak



Karnak Temple Exterior

ii. Temple Architecture (contd)

Temple at Karnak



Avenue of Sphinxes

Ruins of Karnak Temple

iii. Domestic Architecture

- **Includes houses and palaces.**
- **Mud brick and wood were the standard materials for houses and palaces except in rare cases in which stone was used.**
- **According to Diodorus Siculus' Egyptian dwellings were constructed of reeds, a building technique not completely abandoned by the first century BCE:**

  Traces thereof remain among the herdsmen of Egypt who, to these days, do not have habitations but they are made of reeds, which they consider to be sufficient.

  Diodorus Siculus, Historical Library

  After a German translation by Julius Friedrich Wurm, Chapter 46

- **He explained the fact that Egyptian housing was made of perishable materials in his Historical Library as follows:**

  The inhabitants think little of life on earth; while they put greatest value on the continued existence in glorious memory after death. They call the dwellings of the living 'hostels' given that we dwell in them for a short time only. The tombs of the dead they call 'eternal homes' as they assume their eternal continuation in the underworld. This is the reason they invest little effort in the building of houses; but are eager to furnish their tombs with unsurpassable equipment.

  Diodorus Siculus, Historical Library

  After a German translation by Julius Friedrich Wurm, Chapter 46

iii. Domestic Architecture

a. Houses

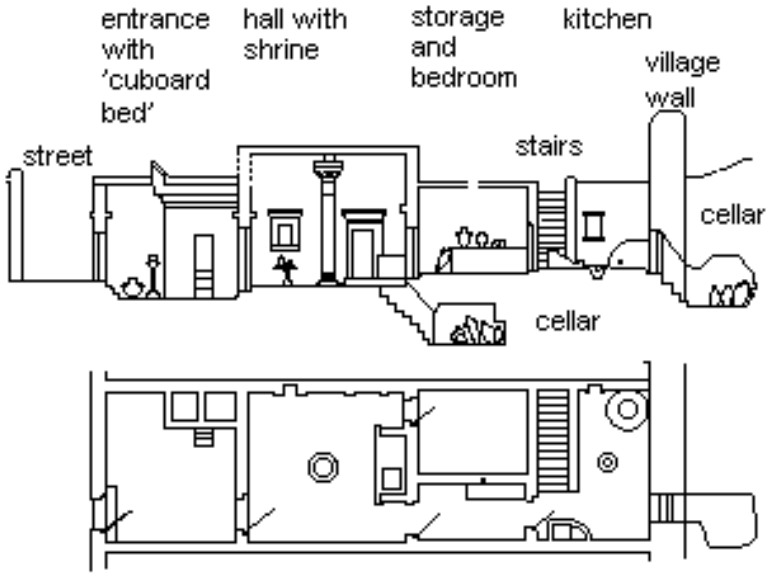
- Commoners dwelling were of crude brick, one or two storey high.
- Mansions of the powerful thou palatial, were built of the same materials.
- Foundations were generally non existent; virgin soil above groundwater level was baked rock hard by the sun and needed just some levelling.
- In order to build on top of collapsed dwellings, the clay rubble was well watered and let to set and harden.
- Wall width was about 400mm for one storey and up to 1.25m for multi-storey buildings. Beams were let into the walls to reinforce them.
- In substantial houses, rooms were arranged around an inner courtyard or on either side of a corridor.
- Wall facing the street often had only one opening, the door, though windows might be let into the upper storey walls.
- Windows were small, covered with shutters or mats in order to keep out the flies, dust, and heat.
- Windows were placed high to reduce sunlight.
- Typical worker's house had 2 - 4 rooms on the ground floor, an enclosed yard, which acted as a kitchen, and 2 cellars for storage. Niches in the walls held religious objects.
- The roof reached by an open staircase served as additional living space and for storage.
- Many people slept on the flat roof during the summer to keep cool. Cooking was also often done on the roof.
- Finer houses had reception rooms and private quarters, while some even had bathrooms and toilets.

iii. Domestic Architecture

a. Houses

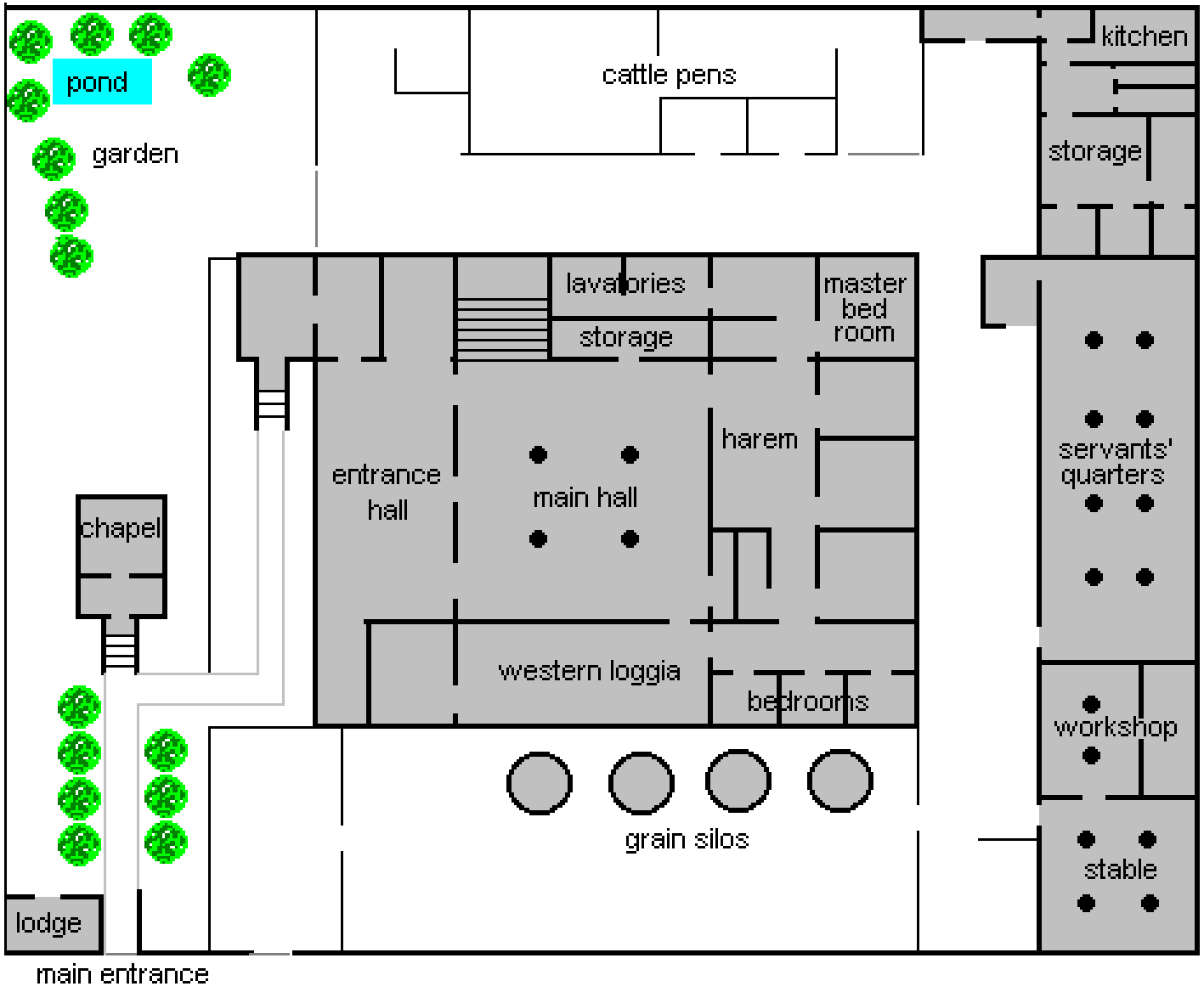
- Toilet seats were made of limestone while others used toilet stools.
- Households disposed off their sewage in pits, in the river or in the streets.
- The houses typically had three or four rooms, comprising a master bedroom; a reception room, a cella for storage, and a kitchen open to the sky.
- The reception suite is normally located on the cooler, north side of the house.
- Villas for important officials were largely and finely decorated with brightly painted murals.
- They had various rooms including separate apartments for the master, his family, and his guests.
- Such houses had bathrooms and lavatories.
- Where space allowed, mansions were built, laid out formally with groves, gardens, and pools
- The ceilings of large rooms were supported by painted wooden pillars.

Worker's Flat



iii. Domestic Architecture

a. Houses



Palatial Mansion Plan

iii. Domestic Architecture

b. Palaces

- For administrative functions of governance and religious duties of the pharaoh.
- Most were built of mud bricks and hence, have not survived well.
- The nature of the Egyptian king was very complex and so were his needs.
- His body housed the royal ka-spirit which transmitted divine aspects of kingship from one king to the next.
- The king also represents the earthly manifestation of various deities such as Ra (the sun god), or Horus (the god of the sky).
- Just like in temples, an entrance way led into an open court followed by a pillared hall, followed by the throne room.
- The king's throne was on a raised platform at the center of the back wall.
- The throne sat within the kiosk that took the place of a shrine in a temple's sanctuary.
- The enthroned king was therefore equivalent to the cult statue of a god.
- In Egyptian belief, foreign lands and their inhabitants represented the forces of confusion.
- Images of bound foreigners were painted on the steps leading to the throne platform and on the platform itself.
- As the king ascended the platform, he walked on these images and sat on them.
- The foreigners lay under his feet in subjection, symbolizing the triumph of the king over the forces of confusion.

GREEK ARCHITECTURE (1050-30BC)

A. INTRODUCTION

- Ancient Greece was used to describe the Greek-speaking world in ancient times.
- It refers not only to the geographical peninsula of modern Greece, but comprises of Hellenic culture that were settled in ancient times by Greeks: Cyprus, the Aegean coast of Turkey (then known as Ionia), Sicily and southern Italy (known as Magna Graecia), and the scattered Greek settlements on the coasts of what is now Albania, Bulgaria, Egypt, southern France, Libya, Romania, Catalonia, and Ukraine.
- Involves paintings, sculpture, buildings and decorative arts produced from about 3000-30BC.
- Importance of Greek architecture to history of western civilization can hardly be overstated.
- Greek artists were the first to establish *mimesis* (imitation of nature) as a guiding principle for art.
- The description of the nude human figure in Greek art reflects Greek humanism – a believe that *'Man is the measure of all things'*.
- Its primary subject matter of the art is the human figure, which may represent gods or mortals, monsters, animals and plants.
- Greek architecture is a legacy that the west has inherited, as they established many of the most enduring themes, attitudes and forms of western culture (e.g. structural elements, decorative motifs and building types still used in architecture today).

B. ARCHITECTURAL INFLUENCES

1. Geographical

- A thousand years before Greek civilization reached its peak, flourished the Aegean culture of the people of the Island of Crete (Cretans are also known as Minoans) who were the first great sea-power of the Mediterranean.
- The civilization grew and expanded, developing a commercial empire protected by naval power.
- Crafts, pottery, communications and trade through coastal towns produced a unity of culture and economic stability.
- Their trade route extended to Greece and her islands and along the whole eastern Mediterranean seaports, which include Asia Minor, Cyprus, Syria, Palestine, Egypt and Libya extending to south Italy and Sicily.
- After the collapse of the Aegean culture, the Greek colonist took over their trade routes, thus establishing their domain not only in the Greece motherland.
- The rugged nature of Greece and its islands, with mountainous hinterlands rendered internal communication difficult and made the sea the inevitable means of interrelationship.
- The mountains of inland Greece separated the inhabitants into groups or clans (city-states), leading to the rivalry which characterized the Greek states, whether in peace or war.

2. Geological

- Little supply of building stone, but abundant supply of marble.
- The marble – the most beautiful and monumental building material – gave a great credence and characteristics to Greek architecture because it facilitates exactness of outlines and refinement of details.
- Even where coarse-grained limestones were used, they often coat the surface with a layer of marble "stucco" in order to achieve this effect.

3. Climatic

- The climate is between rigorous cold and relaxing heat.
- The clear atmosphere and intensity of light was conducive for the development of precise, Greek characteristic exact forms.
- The Greeks have a love for conversation; hence they built porticoes and colonnades to shelter them from the hot sun and sudden showers.

4. Religious

- Their religion was based on worship of nature.
- Divinities were conceived in human form, and represented by small idols, rocks and stone pillars; and all sorts of trees and animals were venerated.
- Mysteries of masculine force were represented by the sacred bull, symbolized by the "horns of consecration".
- The supreme deity was the fertility – or mother-goddess (Hera).

4. Religious

- **Priestesses rather than priests conducted the religious rites since their purity can be confirmed.**
- **Worship centered on sacrificial altars in open-air enclosures, caves, small chapels or household shrines.**
- **When temple architecture began, the Greeks began to represent their deities by large statues.**
- **The religious ceremonies of classical Greek included sacred games, ritual dances, athletic contests and arts.**
- **The Greek gods were personifications of particular elements, or were deified heroes, and each town or district has its own local preferences, ceremonies and traditions.**
- **The principal Greek deities, with their attributes and Roman names are as follows;**

Greek	Attributes	Roman
Zeus	the supreme god & ruler of the sky	Jupiter
Hera	wife of Zeus & goddess of marriage	Juno
Apollo	god of law & reason, art, music & poetry	Apollo
Athena	goddess of wisdom & learning	Minerva
Poseidon	the sea god	Neptune
Dionysos	god of wine, feasting & revelry	Bacchus
Aphrodite	goddess of love & beauty	Venus
Demeter	goddess of earth & agriculture	Ceres

5. Historical and Social

- The Aegean culture between 1800-1600BC achieved a power co-equal with the civilization of Egypt and Mesopotamia.
- The Aegean culture embraced the civilizations of Crete.
- Cretans are also known as Minoans after the legendary king Minos of Knossos. They are equally known as Mycenaean, after one of the great centers, Mycenae.
- The Mycenaean culture was also referred to as Hellenic (classical Greece) and the root of Greek culture lies in Mycenaean culture (1600-110BC).
- The Aegean civilization centered on Crete was initiated by a movement of people from Asia Minor.
- They mingled with the ancient Mediterranean inhabitants; the civilization grew and expanded, developing a commercial empire protected by naval power.
- The Cretan superior trading civilization affected the inhabitants of what is now Greece exporting not only commerce but also cultural influences.
- At the end of the Bronze Age, wars between kingdoms destroyed most Mycenaean centres of power e.g. the Trojan War of 1200BC.
- The geography of Greece did not promote unity because of its rugged mountains, valleys and a jagged coastline.
- Ancient Greece was a disunited land of scattered city-states; thus, Greece entered into a period of relative impoverishment, depopulation and cultural isolation known as the Dark Age.
- Greek history could be divided into several periods;

a. The Orientalizing Periods (Dark Age) c.1100-650BC

- There was increased wealth in Greece in the 7th century BC which was promoted by overseas trade and by colonizing activity in Italy and Sicily that had opened new markets and resources.
- Greece did not send out colonists and nor engaged in vigorous trade, and it declined as a cultural and artistic centre.
- City-states such as Corinth, Sparta, the islands, the cities of eastern Greece and Crete came to the fore with their diverse artistic interests and means of expression.
- The city-states demonstrated their wealth and power particularly in temple buildings, which was to foster new architectural forms, manifested in the decoration of the temples and of the national sanctuaries.
- In early Greek arts, the main role of the architect was to design cult buildings (temples), until the Classical period.
- However, regular visit of the Greeks to Egypt from about 650BC exposed them to Egyptian monumental stone buildings which were the genesis of the ultimate development of monumental architecture and sculpture in Greece.
- Wooden pillars were replaced with stone ones and the translation of the carpentry and brick structural forms into stone equivalents.
- This provided an opportunity for the expression of proportion and pattern, which led to the invention or evolution of the stone "orders of architecture".
- These orders or arrangements of specific types of columns supporting an upper section called an entablature, defined the pattern of the columnar facades and upper works that formed the basic decorative shell of the Greek temple building.

b. The Archaic Period (650-475BC)

- The contact with Near Eastern cultures from the Dark Age became particularly visible influences on the art and culture of Greece during this period.
- Eastern imports into Greece of imitations of objects or motifs and trade were plentiful which led to new prosperity for Greece.
- The new prosperity brought about an age of preoccupation with domestic troubles rather than an age of reaching out to other cultures.
- Powerful dictators supported by arms and by the allegiance of the merchant classes, took over from aristocracies that had governed many of the city-states.
- The city-states became more powerful and more competitive as each court of these dictators became significant cultural centres.
- Monumental building programs became part of this competition, as each community attempted to establish itself as culturally superior.
- Temple buildings became more ambitious being the demonstration of the rulers' wealth and power.
- Hence city-states competed to erect the most beautiful buildings at religious sanctuaries that were *Pan-Hellenic* i.e. sacred to all Greece.

c. The Classical Period (475-323BC)

- The Persian Wars between Persia and Greece around 480-479BC, ended in victory for Athens and the Greeks.
- Considered as the culmination of Greek arts and architecture, with its highest achievements being the Temple of Zeus at Olympia and the Parthenon in Athens.
- People form every city-state came to Olympia to dedicate offerings to the gods and to compete in the Olympic Games which began in 776BC.
- The 4th and 5thcentury despite the political and military excesses, witnessed the great flowering of Greek philosophers of thinking, represented by Plato and Aristotle, particularly Socrates who were not only concerned with the nature of knowledge and the human soul, but there was also prodigious study in physics, mathematics, astronomy and music.
- However, Greek city-states still engaged in constant warfare until 338BC, when Phillip II of Macedonia and his son Alexander defeated the Greeks, thus ending the era of powerful independent city-states.
- Between 334-323BC, Alexander the Great extended his father's empire into Asia Minor (Turkey), Syria, Egypt, Persia (Iraq), Afghanistan and as far as India.

d. The Hellenistic Period (323-30BC)

- After Alexander the Great conquered the Greek city-states, his armies extended Greek civilization far beyond the Greek mainland into the Middle East.
- The 4th century witnessed various attempts by city-states to dominate Greece.
- The confused situation was resolved into a federal system imposed by the supremacy of Macedonia.
- The unification of Greece was accomplished under Phillip (359-335BC), and firmly established under his son Alexander the Great (336-323BC).
- The early death of Alexander at the age of 32 was followed by the division of the empire among his army generals.
- The empire was divided into three monarchies: Antigonius in Greece, Seleucis in Asia Minor and Ptolemy in Egypt.
- These were called Hellenistic (Greek-like) kingdoms, because the ruling classes spoke Greek and the official culture was Greek.
- The city-states failed to maintain unity; there was mutual animosity and economic decline during the 3rd century.
- The disorder created afforded opportunity for intrusion by the centralized, expanding power of the Romans, bringing with them law, order and unified government, and adopting much of the Hellenistic world.
- In the 2nd century BC, Rome dominated politics and began to exert its influence.
- Greece became a Roman province in 146BC, and Rome defeated the other Hellenistic kingdoms of Asia Minor and Egypt in 30BC.

C. ARCHITECTURAL TYPOLOGY

- **Greek architecture consists of essentially building types that were enriched and refined over time, but rarely abandoned or replaced.**
- **It began with simple houses of the Dark Age and culminated in the monumental temples of the Classical Period and the elaborately planned cities and sanctuaries of the Hellenistic Period.**
- **Thus, the raw materials available and the technologies developed to utilize them largely determined the nature of their architecture.**

a. Principal Building Materials

Wood – used for supports and roof beams.
Unbaked bricks – for walls, especially of private houses.
Limestone and marble – for columns, walls and upper portions of temples and other public buildings.
Terracotta (baked clay) – for roof tiles and architectural ornaments.
Metals (especially bronze) – for some decorative details.

b. Religious Architecture

Open-air altars – served as the focus of prayer and sacrifices.
Temples – housed the statue of a god or goddess to whom the sanctuary was dedicated.
Treasury – a small-temple like building, in which offerings to gods and goddesses are made by city-states and citizens at sanctuaries such as Olympics and Delphi.

c. Funerary Architecture

Circular earthen mounds covering built tombs.
Rectangular earthen mounds with masonry façades.
Mausoleums (large independent tombs) or large stately tomb.

d. Public Buildings

Council House – venue where a governing council meet.
The law court.
The fountain house – a building where women filled their vases with water from a community fountain.
Stoa – a roofed colonnade or porticoes open and having column on one side, and often with rooms set along the rear wall.
Agora – an open assembly area or market place. It is the principal public gathering place of the city in which all other structures are lined.

e. Private Houses

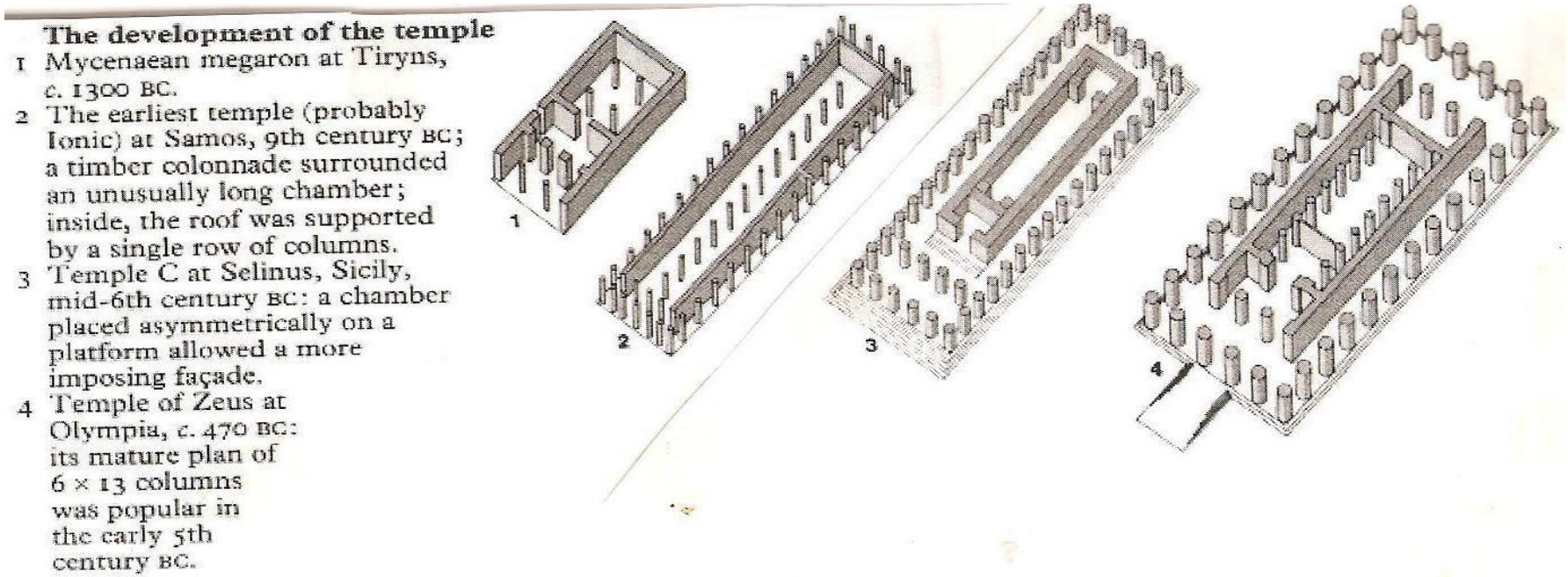
They took many forms. They are:
Early dwellings had just one room in the shape of a rectangle, oval or a rectangle with a curved back wall (an apse).
The multiple rooms' houses had airy and pleasant interiors, as they were generally organized around a small courtyard.
The houses were never impressive from outside because their walls were of flimsy mud-brick or small stones.

f. Entertainment and Recreation Buildings

Open-air theatre
Roofed concert hall.
Gymnasium – an open field surrounded by rows of columns, where youths met for exercise and intellectual discussions.
Stadium/Wrestling ground.
Public Baths.

Greek Temples

- The most characteristic Greek building is the colonnaded stone temple built to house a cult statue of a god or goddess; a statue to whom people prayed and dedicated gifts.
- The temple was developed in the archaic and classical periods.
- Typical temple had a rectangular inner structure known as a *cella,* which was normally divided by two interior rows of columns.
- The cult statue of the god or goddess usually stayed at the rear of this room.
- Most temples were orientated towards the east, and visitors entered on that side through a colonnaded front porch.
- Completely surrounding the inner core of the temple was a continuous line of columns called a *peristyle*.
- Peripteral temples are temples surrounded by columns on all sides thou there origin were debatable.
- The exterior colonnade became the principal distinguishing feature of most Greek temples.
- In the Dark Age, there was no obvious distinction between a temple and a house.
- The first monumental temples of stone were built in the 7th century BC in emulation of the massive buildings in Egypt that the Greeks would have seen or heard about.
- Egyptian influence also led the Greeks to begin to carve monumental stone statues at this time.
- Another factor which led to the great use of stone was the invention of heavy terracotta roof tiles, which needed more support than wood and mud brick could offer.
- Classical examples of Greek temples are: Temple of Zeus at Olympia, Erechtheion, Partehnon and Temple of Athena Nike at Athens.



C2. Architectural Orders

- **An order is a logical or methodical arrangement of components parts such that proper functioning, appearance or harmony is achieved.**

C2.1 Introduction

- **They are pillars used in architecture to support the superstructure of a building, and occasionally as a free standing monument.**
- **They take different shapes, which may be circular or polygonal in cross-section, and are at least four (4) times taller than they are wide.**
- **The first columns constructed took shape from nature in the form of tree trunks or bundled reeds.**
- **This influence can be seen in the style of the stone columns used by the ancient Egyptian and in ancient Mediterranean city of Mycenae.**

C2. Architectural Orders

C2.2 Architectural Orders and Major features of a Greek Temple

- By the end of the 7th century BC, the ancient Greeks developed three (3) major architectural orders i.e. Doric, Ionic and Corinthian order.
- The Doric is the oldest and simplest.
- The Ionic and Corinthian orders were more developed with elaborate schemes for the column's capital and the entablature also differs in each case.
- The architectural orders determined the major features of an ancient Greek temple façade.
- A temple façade was made up of three (3) main parts;

1. The steps
2. Columns
3. Entablature (the horizontal part that rested on the columns)

- Each of these three main parts also had three (3) distinguishing parts;

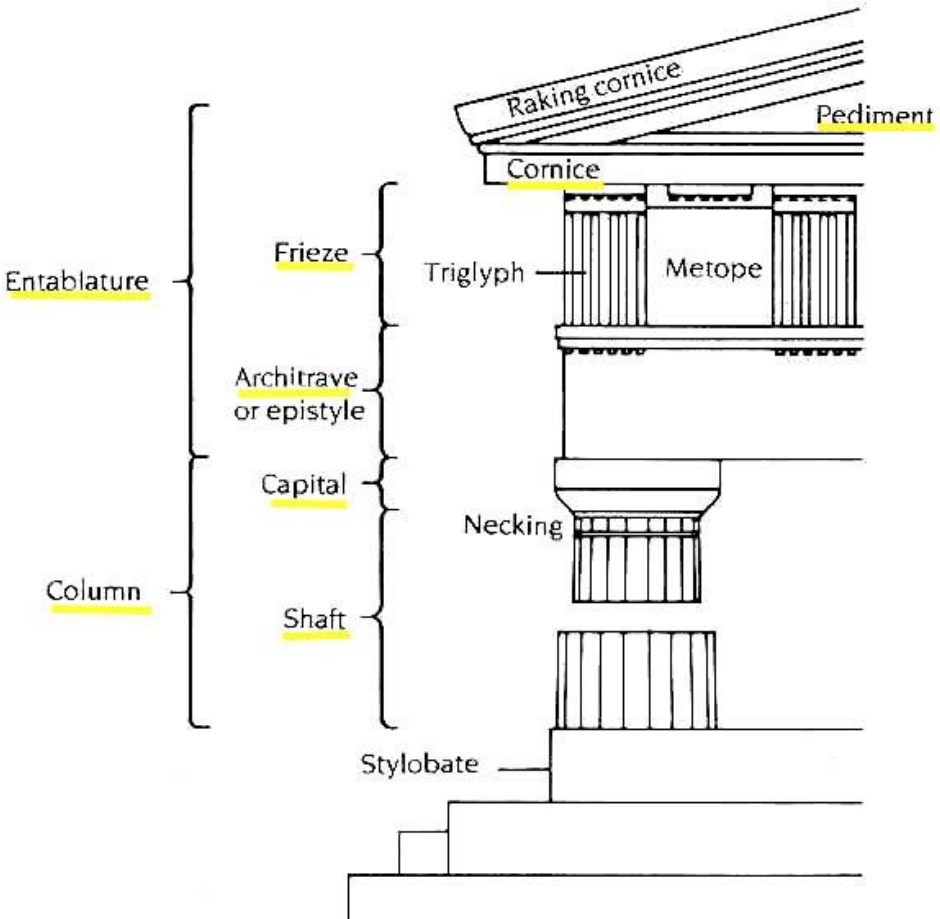
a. The steps – it has three major steps leading into the temple, the topmost is called the *stylobate.*

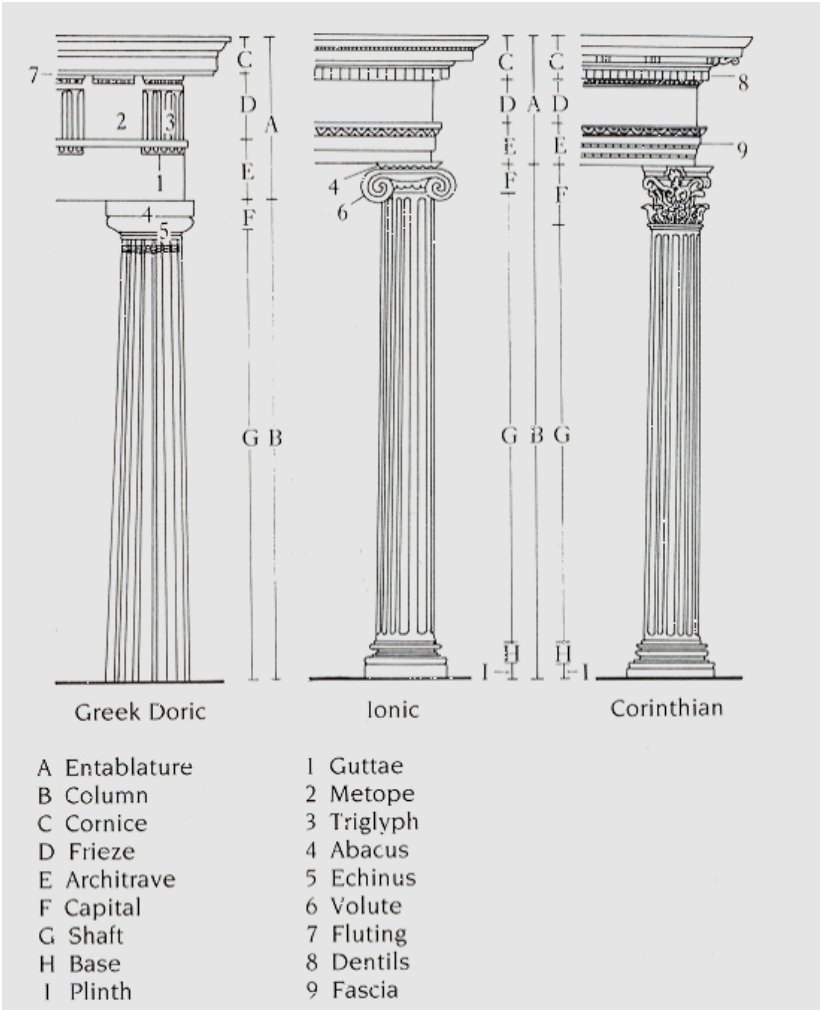
b. The columns – each column consisted of:
   i. Base
   ii. Shaft and
   iii. Capital.

c. The entablature – it consisted of:
   i. Architrave – plain horizontal beam resting on the column
   ii. Frieze – it corresponds to the beams supporting the ceilings and
   iii. Cornice – a set of decorative mouldings that overhung the parts below.

C2.3 Classical Columns

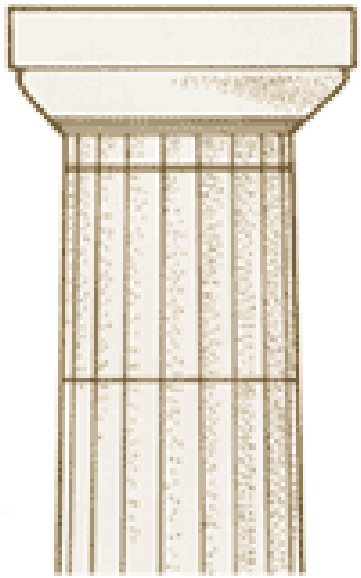
- A column in classical architecture consists of a shaft, base and a capital.
- The capital serves as a visual and structural transition between the vertical shaft and the horizontal wall of masonry for the entablature under the roof.
- Several columns are placed in line in most cases so as to form a colonnade.
- The ancient Greece developed three (3) distinctive, carefully proportioned styles of columns – the Doric, Ionic and Corinthian orders.





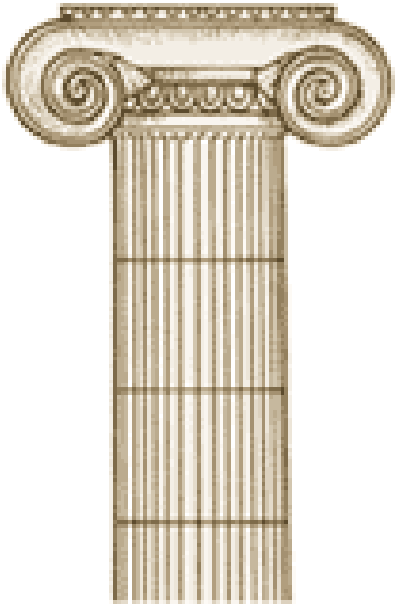
a. Doric Order

- Used for the first time in the 7th century BC.
- It has no base, and the heavy shaft is tapered upward to the capital.
- The surface of the shaft has a slight convex curve, and is indented with shallow, vertical channelling or flutings.
- These features are also found in the ionic and Corinthian orders.
- The Doric capital consists of an undecorated, square slab resting on a rounded disc of stone that tapers down to the top of the shaft.
- Examples of Doric temples are: Temple of hera, Paestum; Temple of Poseidon, Paestum; Temple of Athena Parthenos,Athens; the Parthenon, Athens; the Hephaisteion, Athens.



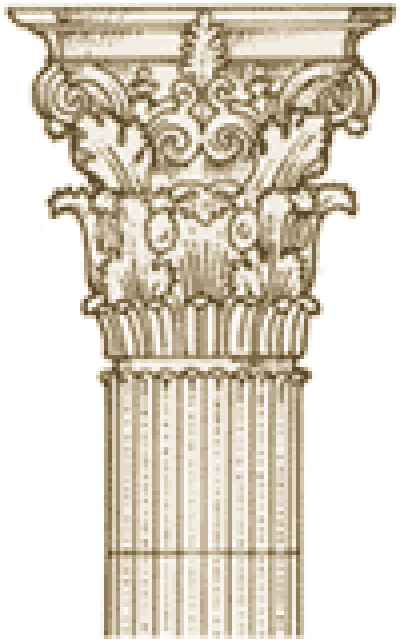
b. Ionic Order

- Ionic order was introduced into Greece from Asia in the 6th century BC.
- The ionic column is more tapered than the Doric column and it rises from a richly moulded circular base.
- Projecting stone spirals known as volutes distinguishes its capital from the rest.
- Examples of Ionic temples are: the Erechteion, Athens; archaic Temple of Artemis, Ephesus; Temple of Athena Nike, Athens; Temple of Ilissus, Athens.



c. Corinthian Order

- Introduced in the 4th century BC as a variant of the Ionic column.
- It is characterized by a slender shaft.
- The capital is in the shape of an inverted bell, which is ornately decorated with volutes and acanthus leaves.
- Examples of Corinthian temples are: Temple of Zeus, Athens.



- The Romans added two (2) types of columns to the classical orders;

d. Tuscan Order

- It is an unfluted modification of the Doric column.

e. Composite Order

- It had the Ionic shaft and a more ornate Corinthian capital.

Other types of orders include;

f. Honorific Column

- Usually a single pillar which was sometimes erected to commemorate an event or to honour a person. e.g. Trojan's Column, Rome.

g. Colossal Order

- An order that rises from the ground above one storey to support the entablature.

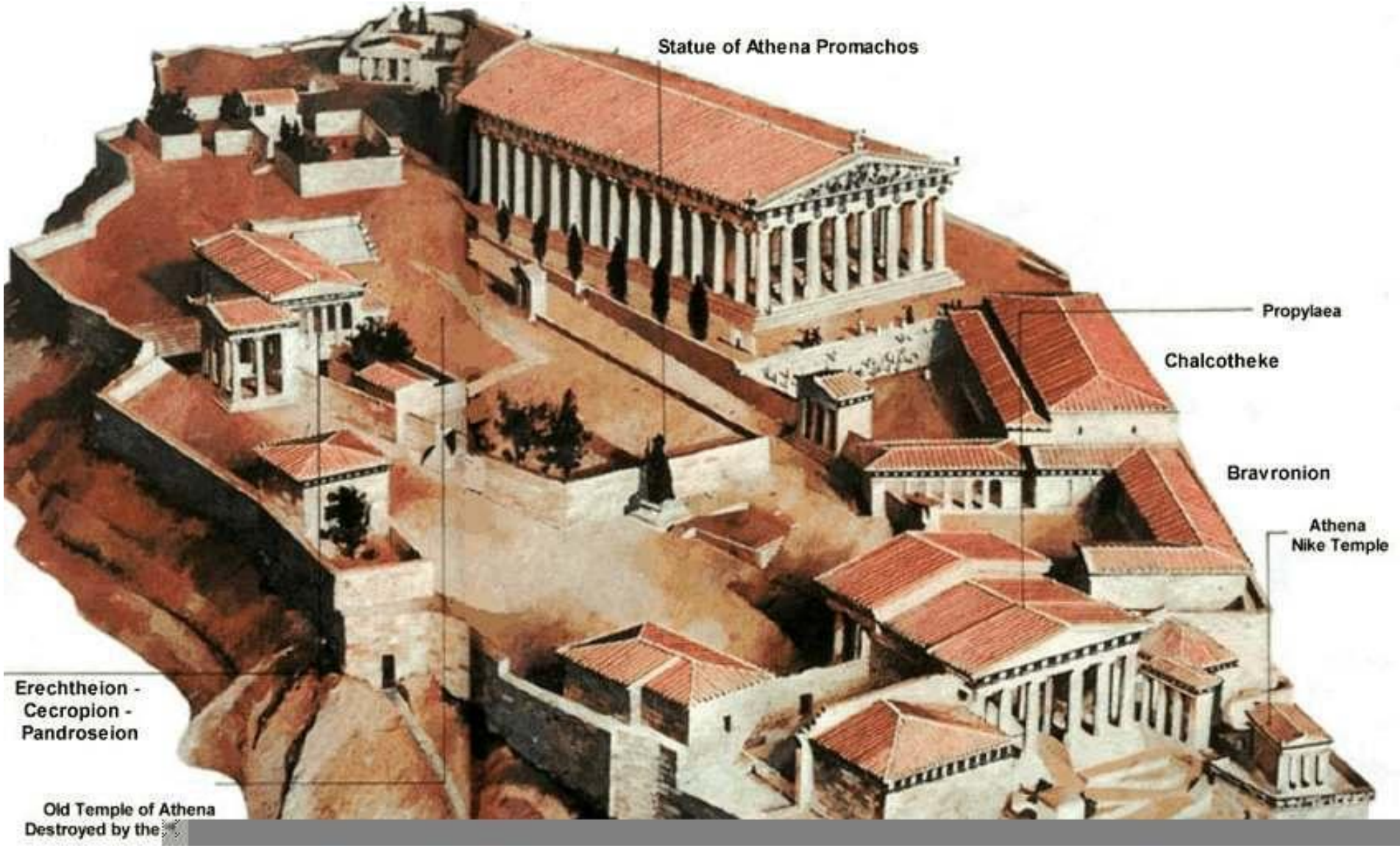
h. Superimposed Order

- A system of arrangement of different types of orders starting from the heaviest on the ground followed by successive lighter orders.
- An example of the superimposed order is found on the Amphitheatre in Rome.

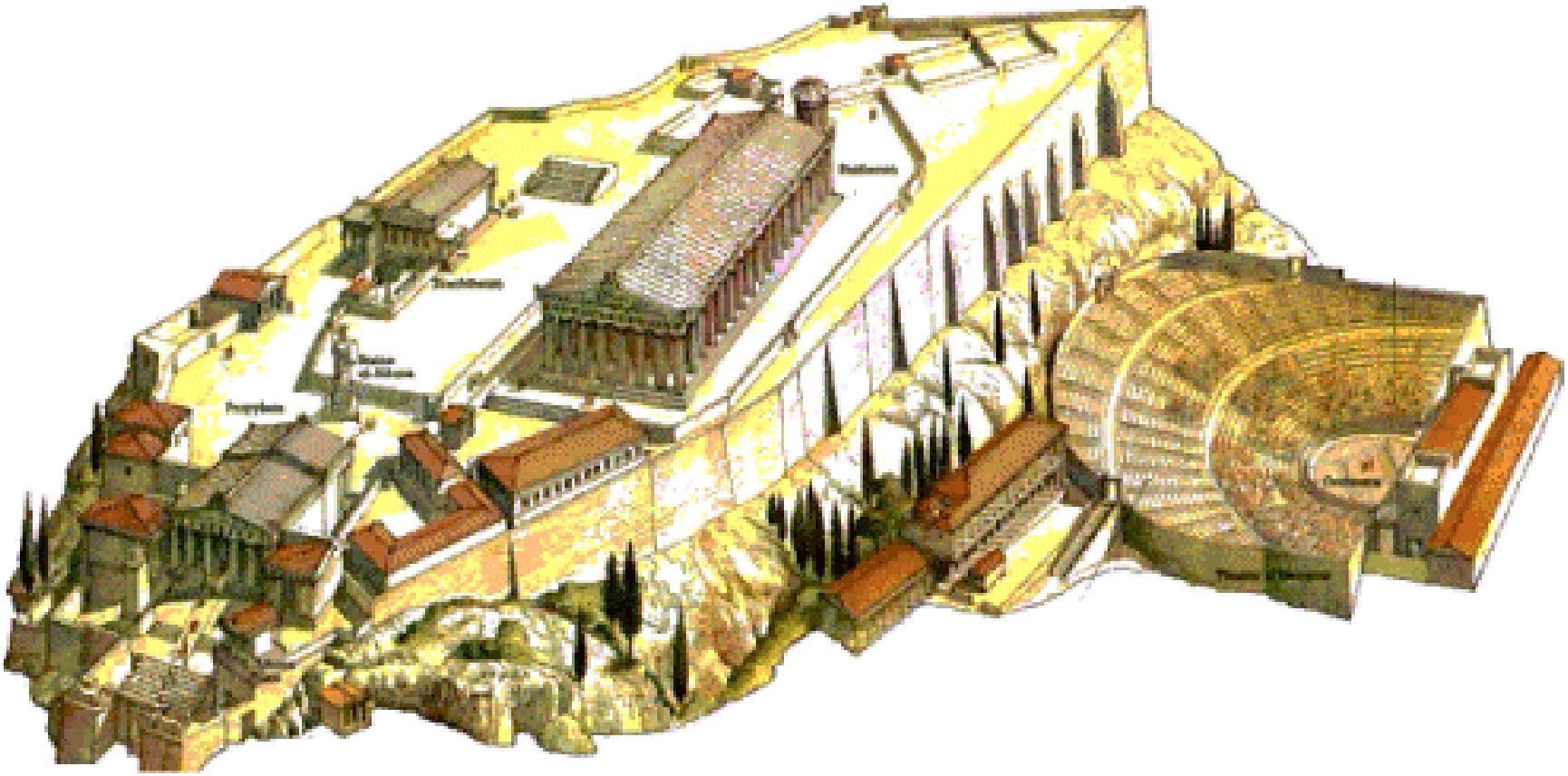
C3. The Acropolis

- Acropolis is derived from two Greek words; *akros* – highest and *polis* – city.
- It is a fortified natural stronghold or the "Sacred Rock" of Athens, in ancient Greece, and it is the most important site of the town.
- It provided a place of refuge for the populace during times of war and also sanctuary for the ruler of the town.
- It served as the town's religious centre and the focal point of its public life.
- The best-known acropolis of the ancient Greece is the Acropolis of Athens.
- It was built on a limestone hill that rises about 150 meters above sea level.
- In 480 BC the Persians destroyed the Archaic temples and monuments on the Acropolis, and for decades there was no major construction there.
- After the Persian Wars ended in 479 BC, Athenian democracy blossomed, its power expanded abroad, and Athens entered a period of great prosperity under the leadership of Pericles.
- Determined to make Athens the cultural leader of Greece, Pericles undertook one of the more remarkable building campaigns in history.
- The campaign centered on the Acropolis and began with the Parthenon (447-432 BC).
- It houses the remains of the Parthenon; a magnificent temple dedicated to the goddess Athena (Greek goddess of Wisdom), the Erechtheion, the temple of Athena Nike and the Propylaea (the monumental gateway of the Acropolis).

C3. The Acropolis



C3. The Acropolis



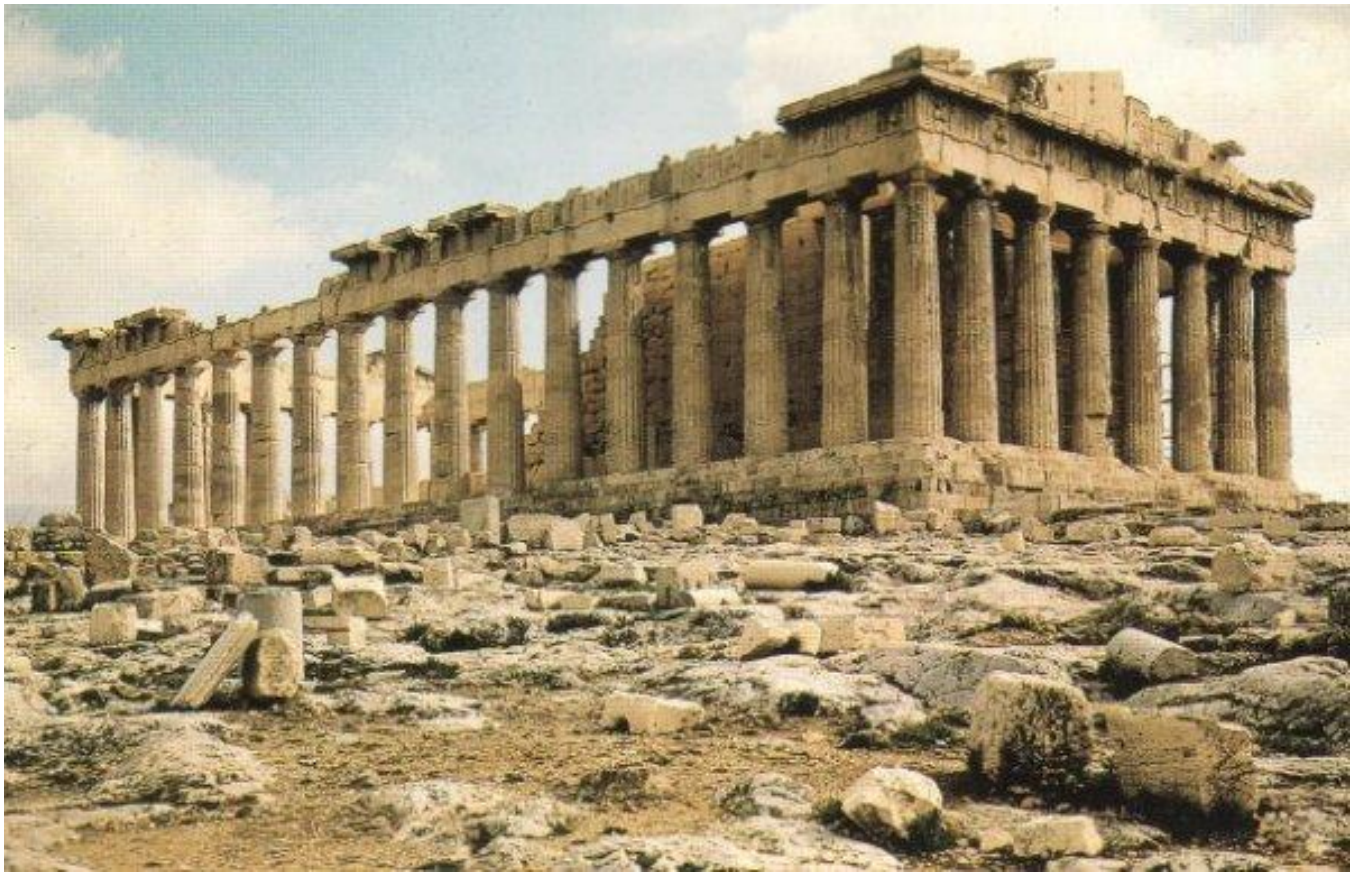
Dorling Kindersley

C3. The Acropolis

C3.1 The Parthenon (447-432 BC)

- **It is the most important and characteristic monument of the ancient Greek and still remains its international symbol.**
- **Dedicated to Athena Parthenos, the patron goddess of Athens.**
- **Built about 447-432BC under the leadership of Pericles, by the architects Ictinus and Callicrates.**
- **Pheidias, a Greek sculptor in conjunction with other sculptors supervised the design of its sculptures.**
- **The temple is built in the Doric order and almost exclusively of marble.**
- **It is a rectangular (31x70m) peripteral-octastyle temple with eight columns on each of the narrow sides and seventeen columns on the long sides.**
- **The central part of the temple called the *cella,* housed the famous cult statue if Athena.**
- **It stands on a crepidoma of three steps; each of the steps is 508mm high and 711mm wide and as these were too steep to ascend with comfort, intermediate steps were provided at the center of the east**

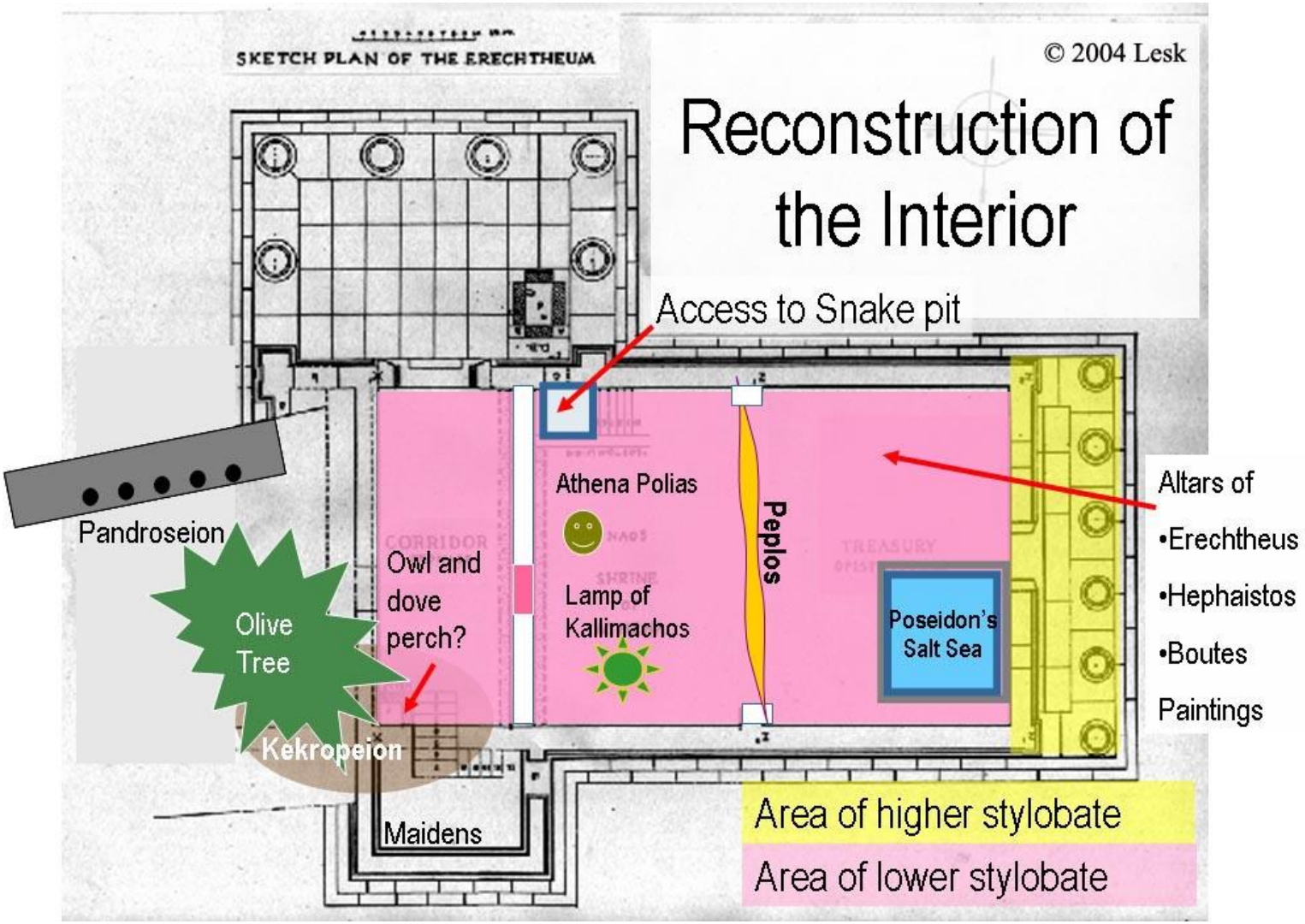
C3.1 The Parthenon (447-432 BC)



C3.2 The Erechtheion (421-405 BC)

- It was built around 420 BC in the Ionic order with the famous entrance porch on the south.
- It was designed by Mnesikles with an unusual and irregular plan.
- The main temple was divided into two sections dedicated to the worship of the two principal gods of Athens – Athena and Poseidon.
- It is laid out in an unusual asymmetrical plan.
- A six-columned porch on the eastern facade is mirrored by six engaged Ionic columns on the western facade, which has no porch.
- Columned porches on the north and south sides are not centered, but are placed toward the western end of the building. The northern porch is larger than that on the south, and awkwardly extends beyond the west side of the building.
- The southern porch, sometimes called the Porch of the Maidens, has six marble maidens called caryatids that support the entablature in place of columns.
- The irregular plan of the Erechtheum can probably be explained by a need for it to incorporate several sacred places of worship already on the site.
- It was characterized by three porches and was constructed at two different levels (one side being 3.2meters below the rest).
- A flight of steps joined the two split levels.

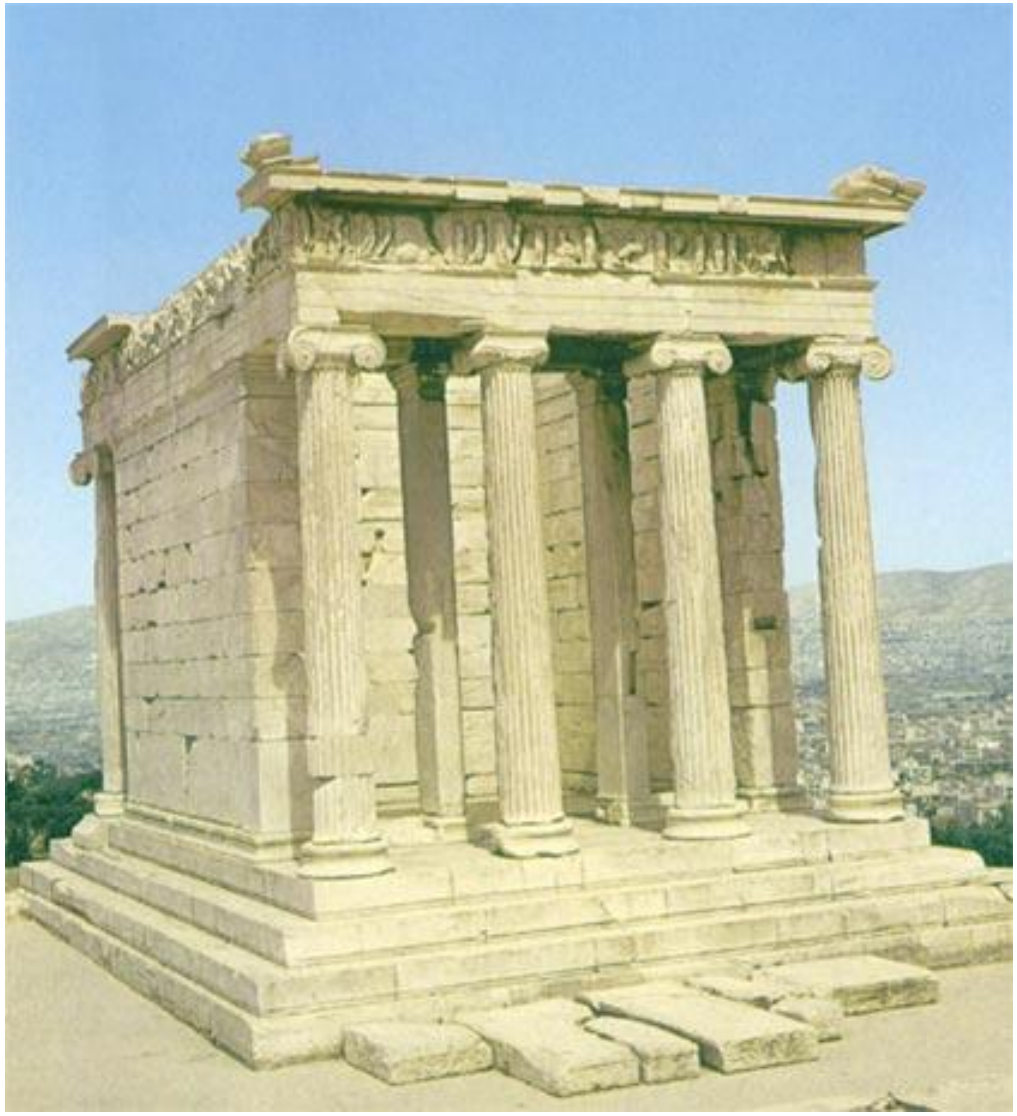
C3.2 The Erechtheion (421-405 BC)



C3.2 The Erechtheion (421-405 BC)

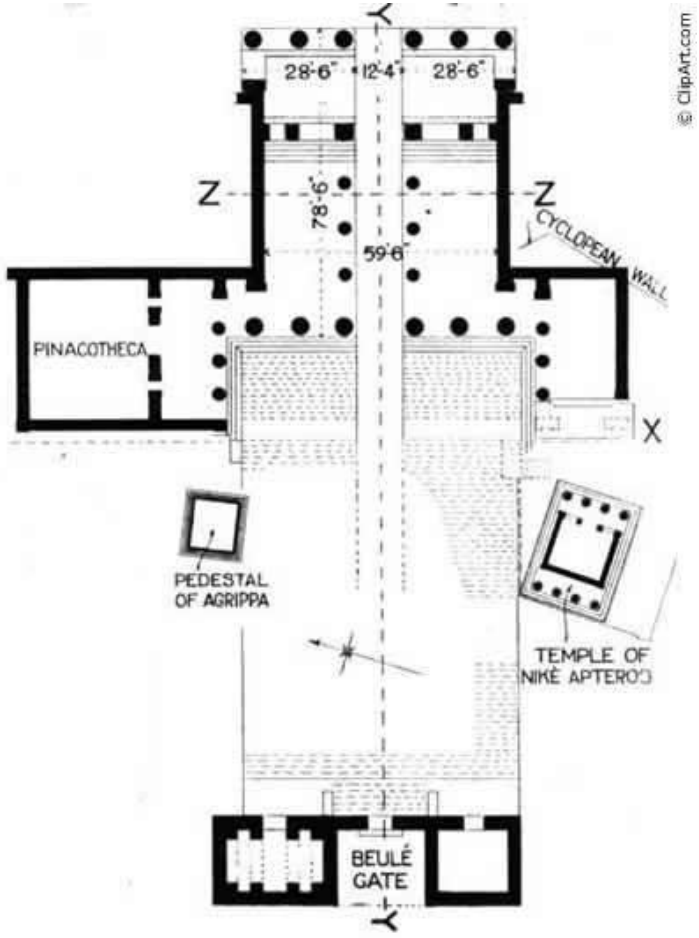
C3.3 The Temple of Athena Nike

- It was constructed around 420BC by the architect Callicrates.
- It was built in the Ionic order, and it is amphiprostyle (building with columns at each ends) with a row of columns in front of each of its narrow sides.

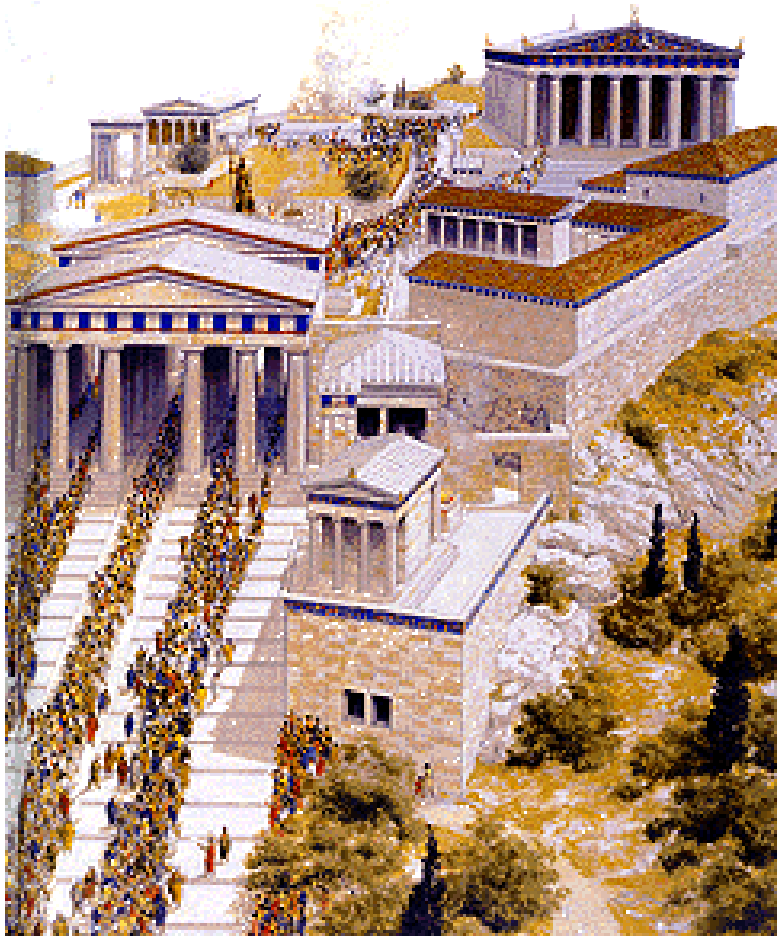


C3.4 The Propylaea (437-432BC)

- It is the monumental gateway of the Acropolis on its steep western approach.
- It was designed by the architect Mnesikles and constructed in 437-432BC.
- It comprises of a central building and two lateral wings.
- The colonnades along the west and east sides had a row of Doric columns while two rows of Ionic columns divided the central corridor into three parts.



Athens Acropolis: Propylaea (undated diagram)



C4. CITY PLANNING

- In the early 5th century BC, cities were laid out in a grid-like plan with streets intersecting at right angles.
- In the 4th century BC, carefully planned cities and civic spaces became the rule in ancient Greece.
- Symmetry and geometric design played an important role in city planning.
- City planners designed distinct residential, marketing, recreation and religious areas and interspersed them evenly throughout the city.

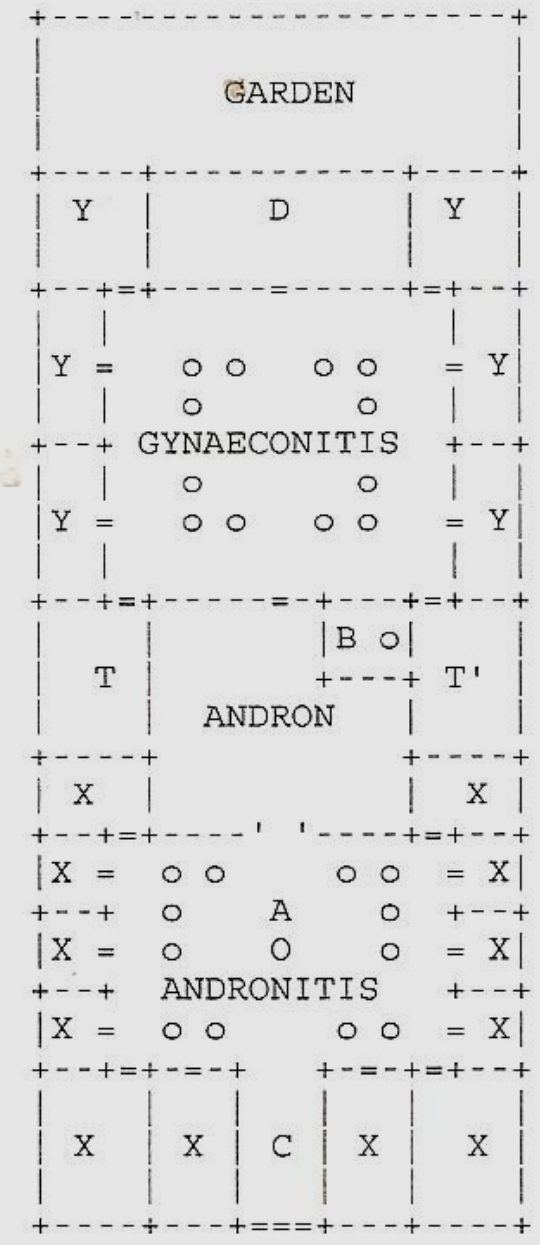
C5. HOUSES

- They varied according to the size of the land, the size of the owner's family, his taste and wealth.
- Two standard plans emerged in the 5th and 4th centuries BC.
- The first had small rooms arranged in a rectangular plan around a colonnaded interior courtyard.
- The second types are larger houses which also focussed on interior courtyards.
- They are with two courts, one behind the other and each with its own dependent chambers (rooms).
- The entrance court is the Court of the Men (Andronitis).
- Women of the house retire promptly on the appearance of a male stranger.
- There is a small stone altar at the center of the colonnaded court with a statue of Zeus the Protector, where the master of the house offers sacrifice.

C4. HOUSES (CONTD)

- Andronitis is the true living room of the house where the master receives visitors.
- The chambers in the andronitis (12 in all) open to the colonnaded courtyard on all four sides.
- The chambers are small and usually lighted only by their doors; used for storerooms and for sleeping for male slaves and for the grown-up boys of the house.
- Because the room are poorly lit and ill ventilated, the average Athenian loves the agora better than his chamber.
- Directly behind the andronitis is the dining hall of the house (Andron).
- At one corner of the andron is a little round altar sacred to Hestia, the hearth goddess.
- The andron also contains the great bedroom of the master and mistress (the thalmos), and another of such bedroom for the grown-up girls of the hoiuse (anti-thalmos).
- Behind the andron is the Court of the Women (Gynaeconitis) – the holy of the holies.
- Greek women are forbidden to participate in so much of public life; to enter into the gynaeconitis of even an intimate friend is an insult at Athens and may lead to a ruinous legal prosecution or bodily chastisement.
- The gynaeconitis consists of the kitchen, rooms for slave women, and in a home of a well-to-do family, a garden.

C4. HOUSES (CONTD)



Conjectural Plan for the House of A Wealthy Athenian.

A = Alter of Zeus Herkelos.
B = Alter of Hestia.
C = Entrance Hall.
D = Kitchen.
T = Thalmos.
T' = Anti-thalmos.
X = Rooms for the Men.
Y = Rooms for the Women.

ROMAN ARTS AND ARCHITECTURE

A. INTRODUCTION

- Distinctive Roman manner of building, sculpting and painting emerged in 2nd century BC.
- They became more exposed to other artistic cultures, notably that of Greece as they began to expand throughout Italy and the Mediterranean.
- Patrons are not just the emperors, senators, and the aristocrats, but of all the peoples of Rome's vast empire including middle-class businessmen, freedmen, slaves and soldiers.
- Roman Architecture was eclectic because of the extraordinary geographic extent of patrons.
- Cohesive factor through all the differences was the Roman character i.e. the ability to organize in large and complex terms, politically, architecturally, or otherwise.
- Modern knowledge of Roman architecture derives primarily from studies of architectural remains scattered throughout the empire.
- Another source of information is a vast store of records, including dedicatory and other inscription on public works.
- The end of Roman arts and the beginning of Medieval architecture is usually said to occur with the conversion of the Emperor Constantine the Great to Christianity on AD330.
- Roman styles continued however in Christian guise onto later civilization.

B. ARCHITECTURAL INFLUENCES

i. Geographical

- **Much of the country is mountainous but not broken up into isolated city-states as in Greece.**
- **Rome has a central and commanding position in the Mediterranean Sea .**
- **While the Greeks were seafaring people, Romans extended their influences by conquest or annexation**
- **Roman Empire was not confined geographically to Italy but included all those parts of north-western Europe, North Africa and Western Asia. (Spain, Britain, Germany, Syria, Romania and North Africa).**

ii. Geological

- **Romans had iron , copper, and tin, terracotta and brick in addition to stone and marble of the Greeks.**
- **they had various building stones such as tufa (with varying degree of hardness); peperino; travertine (hard limestone from Tivoli); besides excellent sand and gravel.**
- **the building material which led to great structural innovations was concrete formed of stone or brick rubble and a mortar of which the most important ingredient was pozzolana (a volcanic earth).**
- **white and colored marbles imported from all parts of the empire were also used extensively.**
- **Despite abundance of varying building materials in regions under its control, concrete, in conjunction with its brick or stone facings was the favourite material, which helped give uniformity of style throughout the empire.**

iii. Climatic

- **Due to the wide expanse of the empire, there were varieties of climatic conditions.**
- **North Italy has the climate of the temperate region of Europe; central Italy is genial and sunny, while the south is almost tropical.**
- **This variety of climatic conditions account for diversity of architectural features and treatment, and produced local modifications in details, yet the Roman architectural character was so pronounced and assertive as to leave little choice in general design.**

iv. Religious

- **They had a polytheist religion which was a fusion of several gods.**
- **roman gods acquired similar attributes to those of the Greeks, but retained their Latin names and rites.**
- **The religion of ancient Rome under the priest class acting as apparatus of the state, soon became part of the constitution of the state.**
- **The emperor ultimately received divine honours and was described as the head of all varieties of deities under the widespread Roman rule.**
- **Dissatisfaction with state religion showed itself from time to time.**
- **Every family had an altar to the family gods (Lares) and ancestor worship was a recognized art of religious rites.**
- **Despite periodic persecution, Christianity increased in its appeal, and it became sufficiently widespread to be recognized by the Emperor (Pontifex Maximus) Constantine in 313AD as equal with other religions.**

C. ARCHITECTURAL CHARACTER

C1. Building materials

i. Volcanic stones eg. tufa, peperino, albani and travertine. Used for the exterior walls and interior decorations on public buildings. e.g. Colosseum in Rome.

ii. Marble: used mainly for decorative purposes. It was set in cement and applied in slabs to bricks and concrete walls. Also used for pavements either by cutting it into slabs and arranged in patterns or as mosaic. e.g. Flavian Palace in Rome and Hadrian's Villa at Tivoli.

iii. Unburnt bricks (faced with stucco): used especially for private houses (very few remains).

iv. Kiln-baked bricks and tiles: used as the most common facing for concrete as a protective skin.

v. Stucco: used as a facing over unbaked bricks, coarse stone and concrete. Served as a protection against weather and also as a finish. Takes a high polish or fine moulding; hence it became the vogue for decoration especially in the interior of houses.

vi. Bronze: used in a decorative manner on doors, grilles, panels of ceilings, and other details.

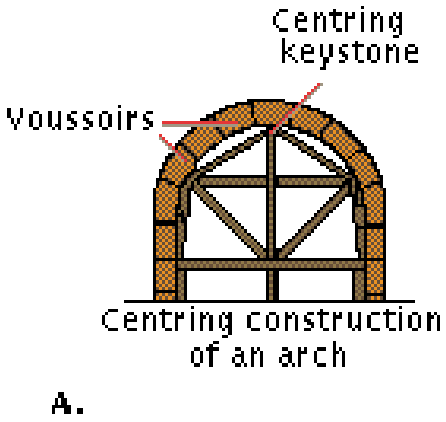
vii. Pozzolana: a fine, chocolate-red volcanic earth, which when mixed with hydrated lime forms excellent cement that will set even under water. When mixed with aggregates, it forms concrete which lightens the weight of structures. Concrete was used in all great imperial buildings (e.g. baths of Caracalla and Basilica of Maxentius in Rome). It enabled the development of new architectural forms by the Romans.

C2. Building Construction

- Done by state agencies or private contractors, employing slave or free labour.
- Techniques and crafts were highly developed; machines were simple and powered by men or animal.

i. Masonry or concrete walls (faced or unfaced): early stonewalling were without courses (continuous horizontal layers). Concrete walls, except below ground, were always faced.
ii. Columns and piers: usually of stone and monolithic.
iii. Arches: used in gates, bridges, and aqueducts, as well as in colonnades and doors.
iv. Vaults: Roman vaults were simple geometric forms. They are usually composed of stone, concrete, or brick and are heavy structures that exert downward and outward pressure onto their supports.

- Barrel vault: it is semicircular in shape and the simplest form of vault. It is a continuous series of arches deep enough to cover a three-dimensional space. It the same kind of thrust as the circular arch and must be buttressed along its entire length by heavy walls with limited openings.
- Groin (intersecting) vault: it is formed when two barrel vaults intersect at right angles, which when repeated on series, could span rectangular areas of unlimited length.
- Rib vaults: it is a groin vault that had ribs added along the groins.



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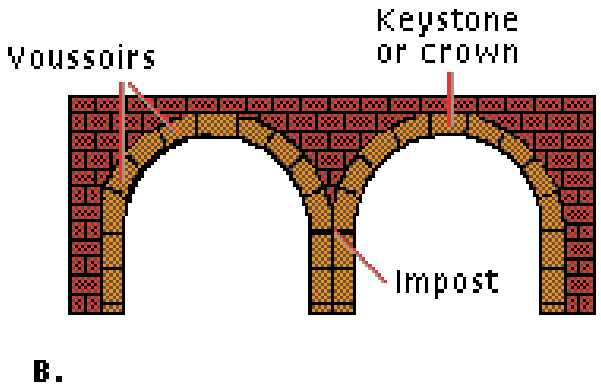
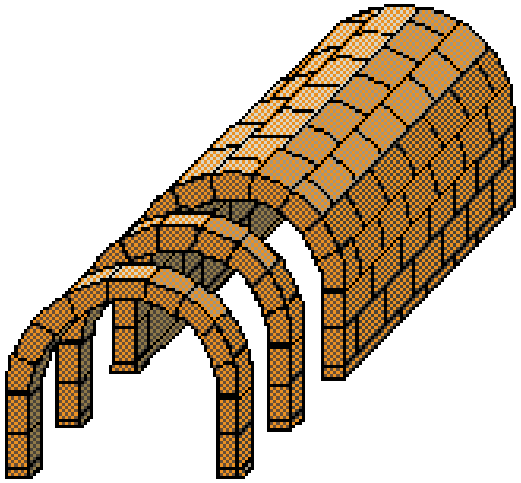


B.



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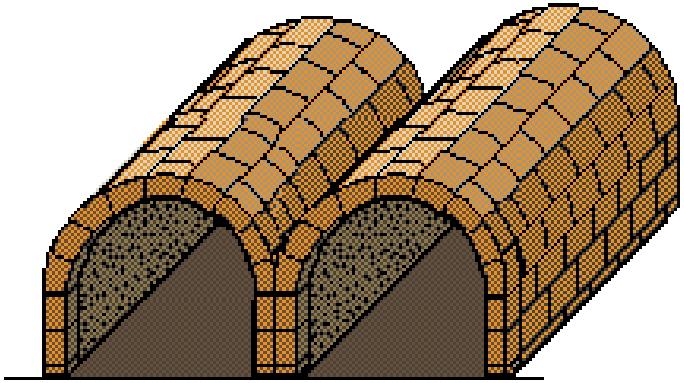
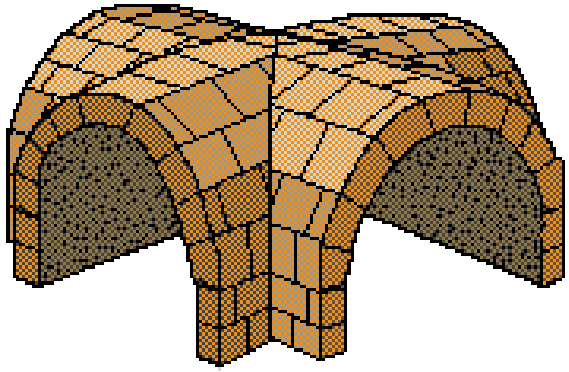


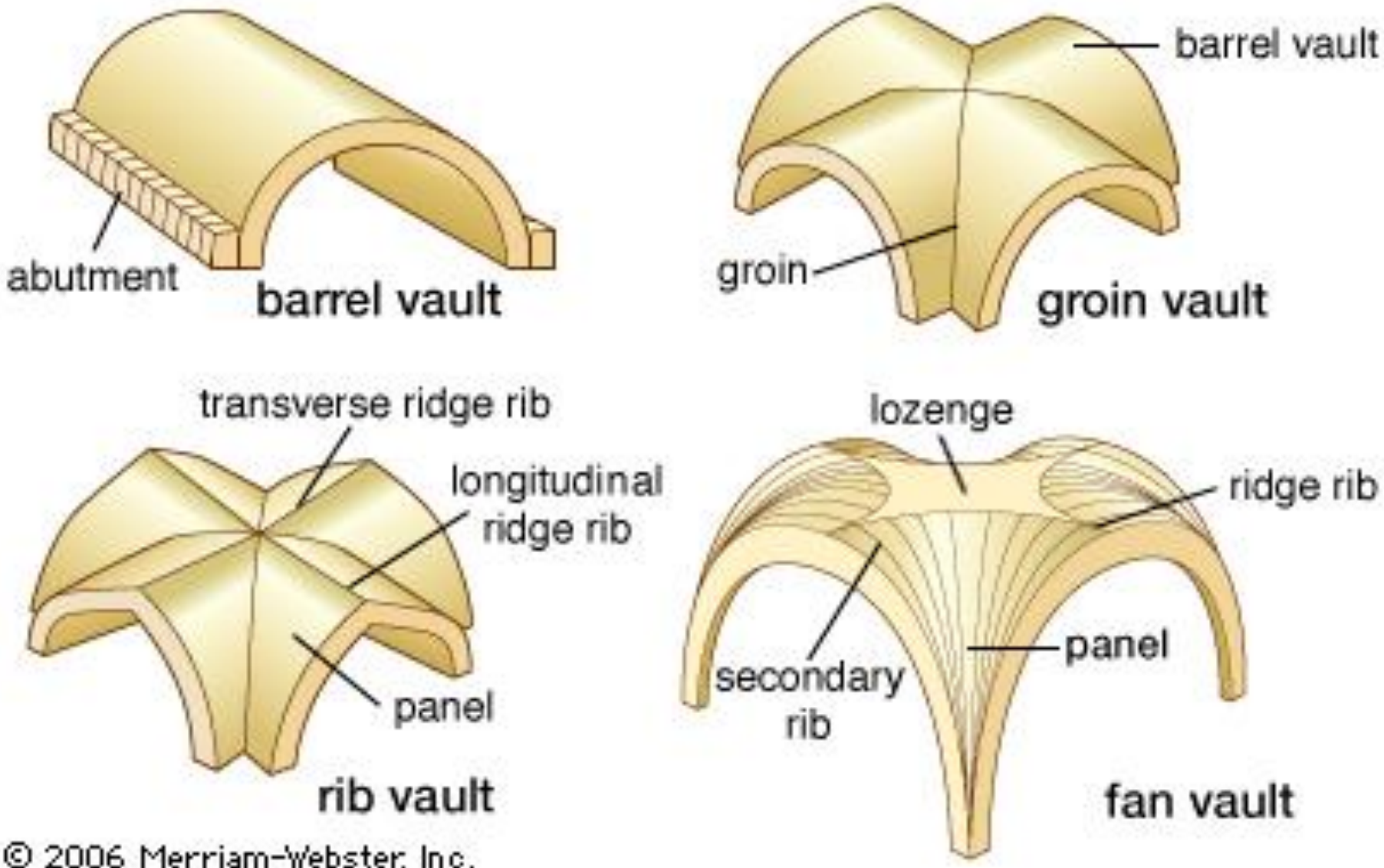
D. Barrel vault



E. Cross (groin) vault

Arches and Vaults

The construction of an arch (A) requires a temporary wooden structure to hold the voussoirs (wedge-shaped bricks or stones) until the keystone, or central voussoir, can be put into place. Arches are connected with the aid of an impost (B), a piece of moulding located where the arch begins. Imposts are also used at the point between an arch and the capital of a column. Arches can be connected (C) to form a barrel, or tunnel vault. A series of barrel vaults (D) is used to create an arched ceiling or roof. A variation on this is the cross, or groin, vault (E), in which two barrel vaults intersect.


abutment
barrel vault
barrel vault
groin
groin vault
transverse ridge rib
longitudinal ridge rib
panel
rib vault
lozenge
ridge rib
secondary rib
panel
fan vault
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C4. Public Buildings

- **Various building types were built to suit their status and to meet their social and private needs.**

i. Roman Temples

Differences between Greek and Roman temples

Greek	Roman
a. Three steps all around the structure	Flight of steps on the entrance façade.
b. Oriented to face east-west	Oriented to all points of the compass in relationship to other buildings.
c. Sacred hence isolated from other buildings	Situated in the earth of the cities.
d. Simple entrance portico	Entrance façade emphasized and the entrance portico was deepened for easy identification
e. Smaller cella	Wider cella

- **Best preserved example of a Roman temple is the Maison-Carree at Nimes, France.**

Maison-Carree, Nimes, France (c. 4AD)

- **Built by Marcus Vispanius Agrippa (63-12 BC), son-in-law of Emperor Augustus (originally known as Octavian, heir of Julius Caesar).**
- **Dedicated to Gaius and Lucius Caesar, adopted sons of Augustus.**
- **Rectangular in plan; 25 m long by 12 m wide.**
- **Gable roofed, deep entrance porch and a frontal staircase giving access to its high platform or plinth.**
- **Built with 6 Corinthian columns: a strong influence of Greek temple style.**

- **The Romans also built many circular temples.**
- **Greatest surviving circular temple and the most important Roman building is the Pantheon, Rome.**

Pantheon, Rome.

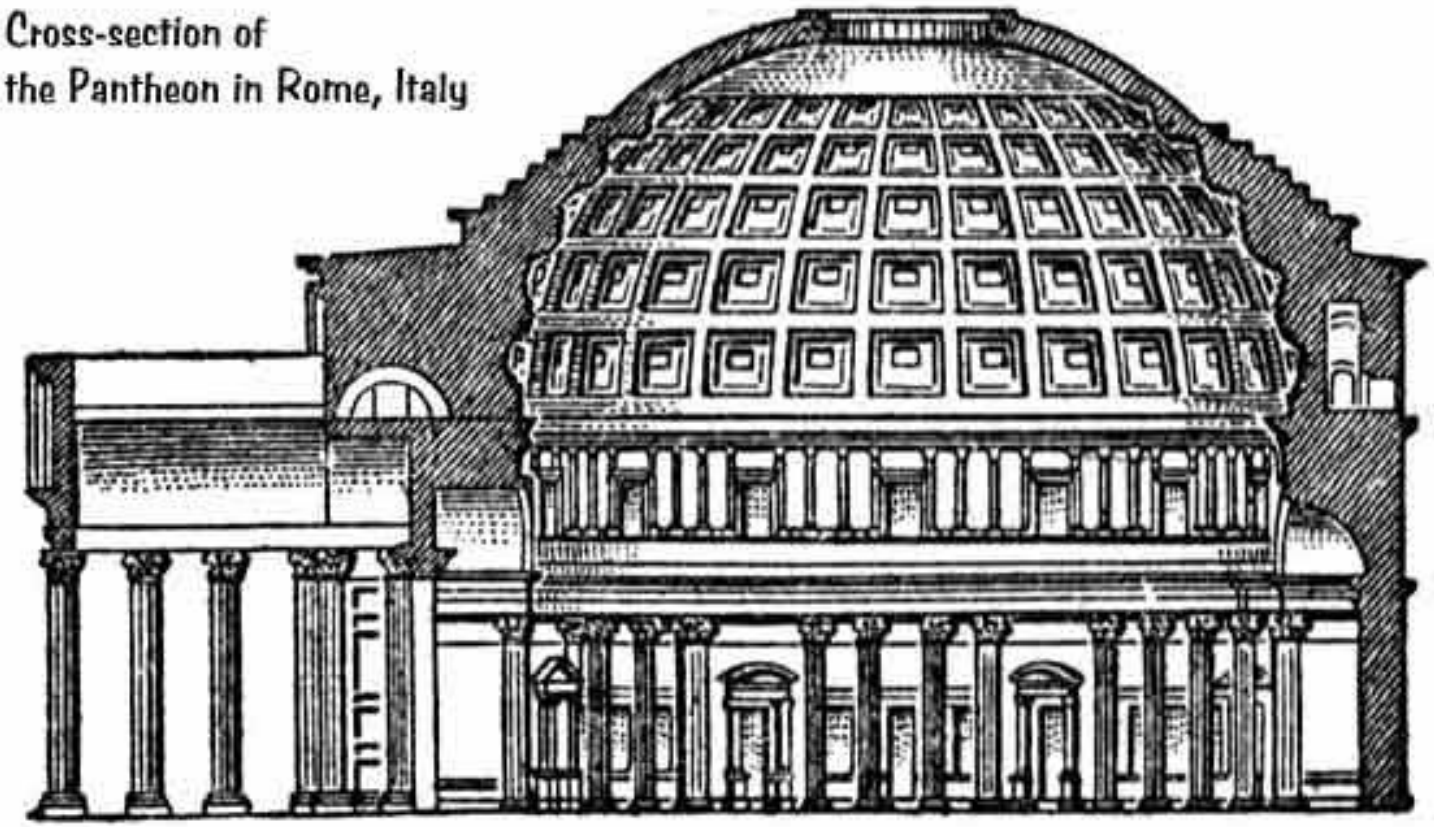
- **Most preserved buildings of ancient Rome and one of the most significant buildings in architectural history.**
- **Begun in 27BC by the Roman general and statesman Marcus Vispanius Agrippa.**
- **Built to commemorate his victory over combined forces of the Roman general Mark Anthony and Cleopatra, queen of Egypt in the battle of Actium in 31BC by which Octavian became the first Roman emperor in 27BC and assumed the name Augustus.**
- **Begun as a rectangular temple measuring 44m wide and 22m deep with a gabled roof supported by a colonnade on all sides.**
- **Completely rebuilt by emperor Hadrian (Latin, Publius Aelius Hadrianus) (76-138AD), Emperor of Rome (117-138), between 118-128AD when it was converted to a rotunda of concrete faced with brick.**
- **Some alterations were made in the early 3rd century AD by the Emperors Lucius Septimius Severus (146-211), Roman Emperor (193-211) and his son, Caracalla (188-217)- original name is Bassianus and ruled as an Emperor with the name Marcus Aurelius Antoninus.**
- **It has a great concrete dome rising from the walls.**

Pantheon, Rome.

- **Has a front porch of eight (8) Corinthian columns supporting a gabled roof with triangular pediment.**
- **Entrance porch is characterized by huge bronze double doors, 7m high (the earliest largest example of its kind).**
- **The dome was the largest built until the advent of modern architecture, measuring about 43m in diameter and rising to a height of 22m above its base and 43m from the ground.**
- **No external evidence of brick arch support inside the dome; exact method of construction not known.**
- **2 major factors contributed to its success:**
  i. **excellent quality of mortar used in the concrete**
  ii. **careful selection and grading of the aggregates.**
- **The temple's immense circular space was lit solely by the 8m 'eye' or oculus; a revolutionary concept.**
- **Exterior is plain while the interior is lined with coloured marbles.**
- **The Pantheon was dedicated in 609AD as the church of the Santa Maria Rotunda.**

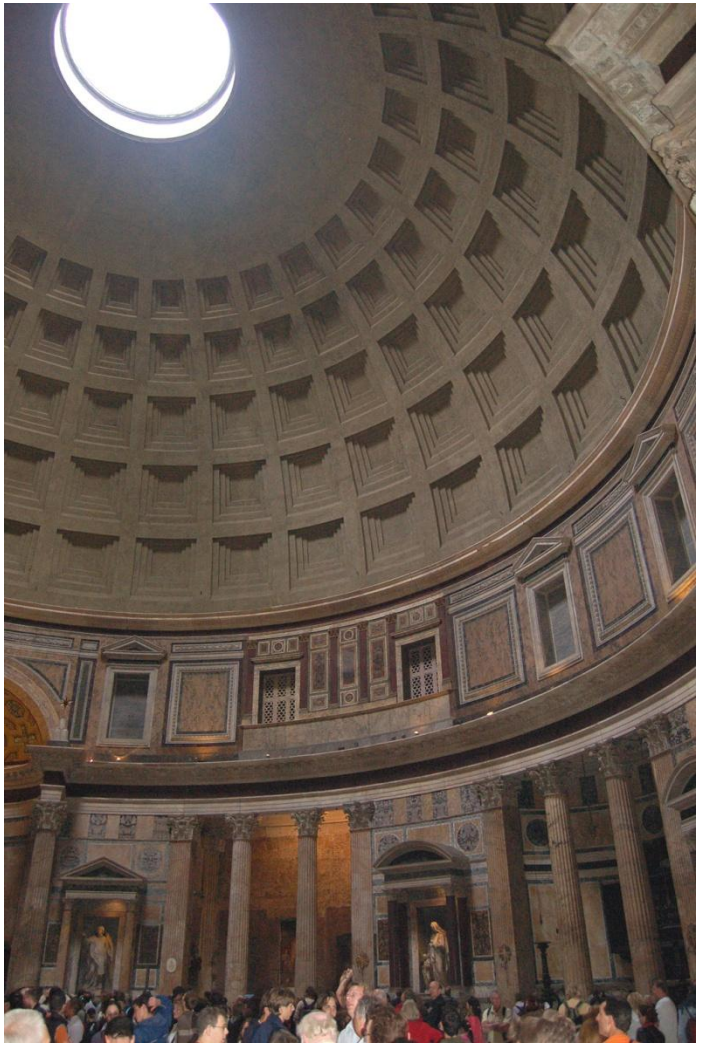
Gallery of Pantheon, Rome.

Gallery of Pantheon, Rome.



Gallery of Pantheon, Rome.

Gallery of Pantheon, Rome.



ii. Roman Tomb

- Consisted of an earth mound (tumulus), surrounded by a ring of masonry rising usually to a considerable height.
- Most notable examples are the Tomb of Caecilia Metella on the Via Appia and Hadrian's Tomb.

Hadrian's Tomb (Castel Sant' Angelo)

- Originally the mausoleum of Emperor Hadrian and, until Caracalla, the burial place of the Antonine Emperors.
- Antonine Emperor is the name of a dynasty of the five good emperors who reigned between 138-180 marked by a period of great internal peace and prosperity.
- Built 135–139 AD and converted into a fortress in the 5th century.
- The fort is a circle in plan surrounded by a square.
- Each corner of the square is protected by an individually designed barbican, or outwork.
- The central circle contains halls, chapels, apartments, courtyard, and prison cells.
- The castle served as a refuge in times of trouble in the Middle Ages, especially for the popes, who could reach it from the Lateran through a protected passage.
- Used as a prison until 1901, when its restoration was begun. Part of it is now a museum of military history.

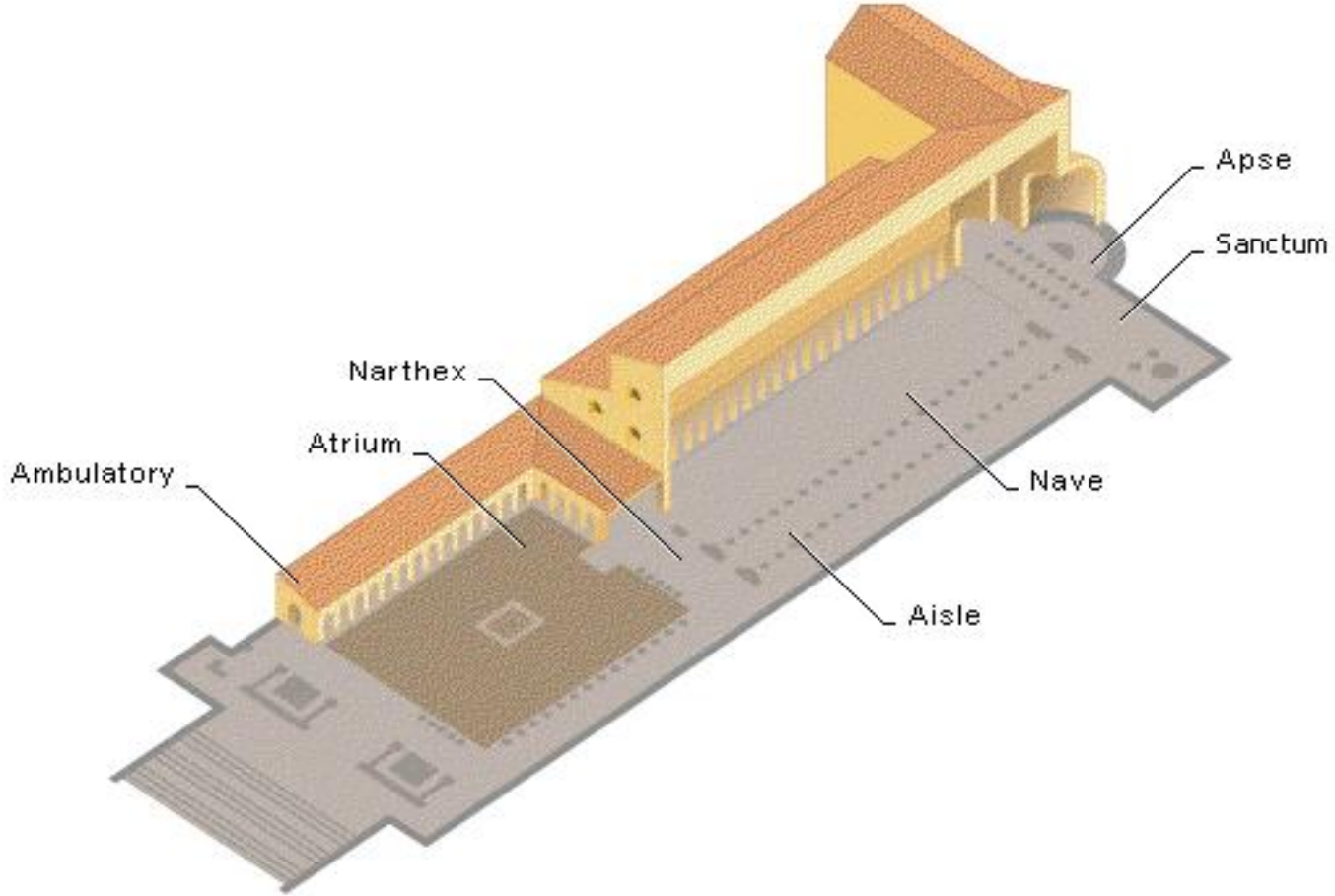
Hadrian's Tomb (Castel Sant' Angelo)

Hadrian's Tomb (Castel Sant' Angelo)

iii. Basilica

- **A basilica in its earliest usage was a large covered public hall in ancient Rome and pre-Christian Italy used as a meeting hall, courthouse, banking, and for other commercial purposes.**
- **Usually flanked by side aisles set off by colonnades and with a raised platform at one or both ends.**
- **Used for judicial purposes in the 1st century, hence the raised platform became enclosed by an apse to accommodate the magistrate.**
- **Early Christians adopted it for their churches.**
- **Emperor Constantine commissioned the construction of three enormous Christian basilicas in Rome: St. Peter's Basilica, Rome; S. Paulo fuori le Mura, and S. Giovanni, Laterano.**
- **The transept (a lateral aisle crossing the nave just before the apse) was added, thus creating the cross-shaped plan that became standard for churches in Western Europe throughout the Middle Ages.**
- **The columns separating the nave from the aisles in early Christian basilica carried either arches or entablature which in turn, carries a blank wall supporting the timber roof of the nave.**
- **The nave rose higher than the side aisles, hence the wall that supports the nave roof stood above the level of the side aisle roof and could thus be pierced at the top with windows to light the center of the church.**
- **The high nave wall is called the clerestory wall and the windows pierced in them are called clerestory windows.**

iii. Basilica



St. Peter's Basilica, Rome.

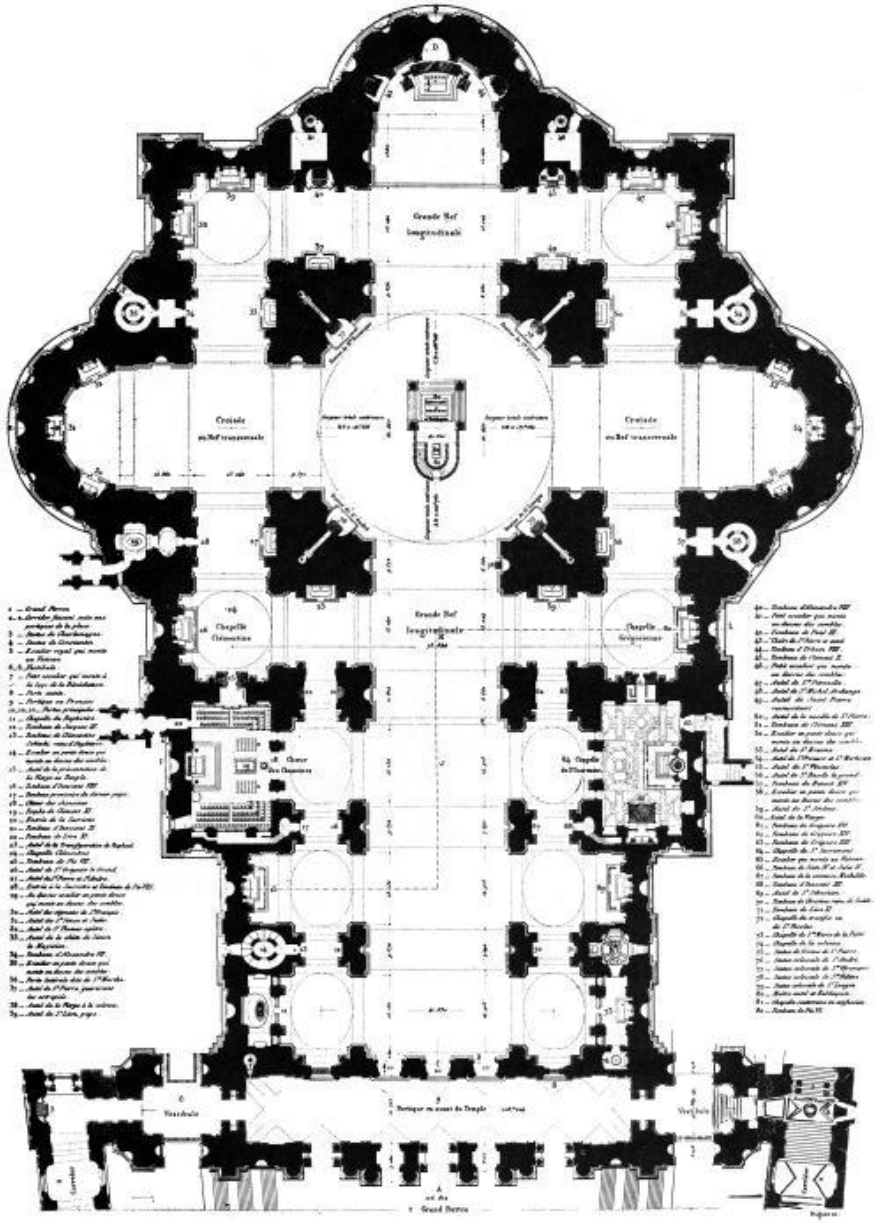
- Constantine, the first Christian emperor of Rome, built the Old St. Peter's Basilica in 326AD on the Vatican Hill; this gave official recognition to the hill.
- Vatican City comes from the name of the Vatican hill on which it is located.
- This was the place where St. Peter, the chief apostle of Jesus Christ was crucified and buried around 64AD.
- Gradually, houses and palaces were built on the hill and from the 13th century, popes made the Vatican their official residence.
- In the mid-15th century, the Old St. Peter's started falling into ruins and Pope Nicholas V ordered the reconstruction and the enlargement of the church after plans by architect Bernado Rossellino.
- After the death of Pope Nicolas V, Donato Bramante was appointed by Pope Julius II in 1506 as the chief architect of the new basilica.
- Bramante initiated the basilica design as a Greek cross plan with a massive central dome.
- At the death of Bramante in 1514, artists such as Raphael, Fra Giacondo de Verona, and Giuliano da Sangallo, modified the original Greek cross plan to a Latin cross with three aisles separated by pillars.

St. Peter's Basilica, Rome.

- In 1546/7, Pope Paul III commissioned Michelangelo who designed the imposing dome and reverted the plan back to the Greek cross plan.
- Michelangelo died in 1624, two years before the completion of the dome.
- Carlo Maderno under order from Pope Paul V, again exchanged the Greek cross for the Latin cross by extending the nave to the east, thus completing the 187m long main structure.
- The basilica was finally dedicated by Pope Urban VIII in 1626.
- The basilica includes 45 altars decorated by many famous artists and is now a tourist attraction.
- The interior can be visited daily free although a strict dress code is applied.
- The dome can also be visited although entrance is not free but worth it.
- There is an option of taking the elevator or the stairs, the stairs being cheaper.
- From the top of the dome, there is a magnificent view of Rome and of St. Peter's Square in particular.
- It was the largest church in the Christiandom until surpassed in 1989 by the newly built basilica in Yamoussoukro, Côte d'Ivoire.

St. Peter's Basilica, Rome.

St. Peter's Basilica, Rome.



St. Peter's Basilica, Rome.

St. Peter’s Basilica, Rome.

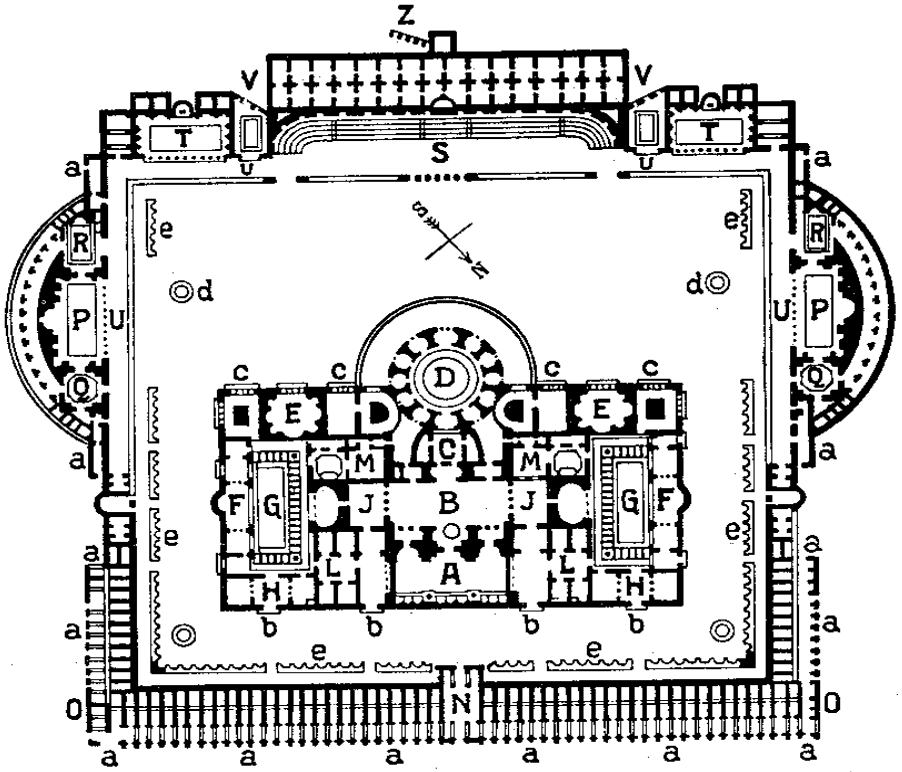
iv. Public Baths

- **Built to provide facilities for communal or private washing and bathing.**
- **Made up of a large open garden surrounded by suite of dressing rooms and a block of bath chambers with apodyterium (changing room), laconium (steam bath), hot room (caldarium), warm room (tepidarium), and cold room (frigidarium).**
- **Service was furnished by means of underground passageways, through which slaves could move swiftly without being seen.**
- **Clerestory windows were used for lighting the roofing of the enormous rooms.**
- **Imperial baths were built for the pleasure of the leisure classes and became a recognized feature of Roman life.**
- **Facilities include gymnastic exercise halls and halls for philosophers, poets and those who wish to hear them gathered.**
- **Best preserved are the Baths of Caracalla and those of Diocletian (c.298-306AD), with accommodation for 3200 bathers.**

Baths of Caracalla, Rome

- **Begun by Emperor Septimus Severus in 206AD and completed by his son, the Emperor Caracalla in 217AD.**
- **Amongst Rome's most beautiful and luxurious baths designed to accommodate about 1600 bathers.**
- **Consisted centrally of a block of large vaulted bath chambers covering an area of 230m long by 115m wide, with courts and auxiliary rooms, surrounded by a garden with space used for exercises and games.**
- **There were three main bath chambers: the frigidarium (cold room), tepidarium (tepid room) and the caldarium (hot room).**
- **There were also large open-air swimming pools.**
- **Marble was used lavishly, and sculpture, mosaics, frescoes and other decorations ornamented the interior.**

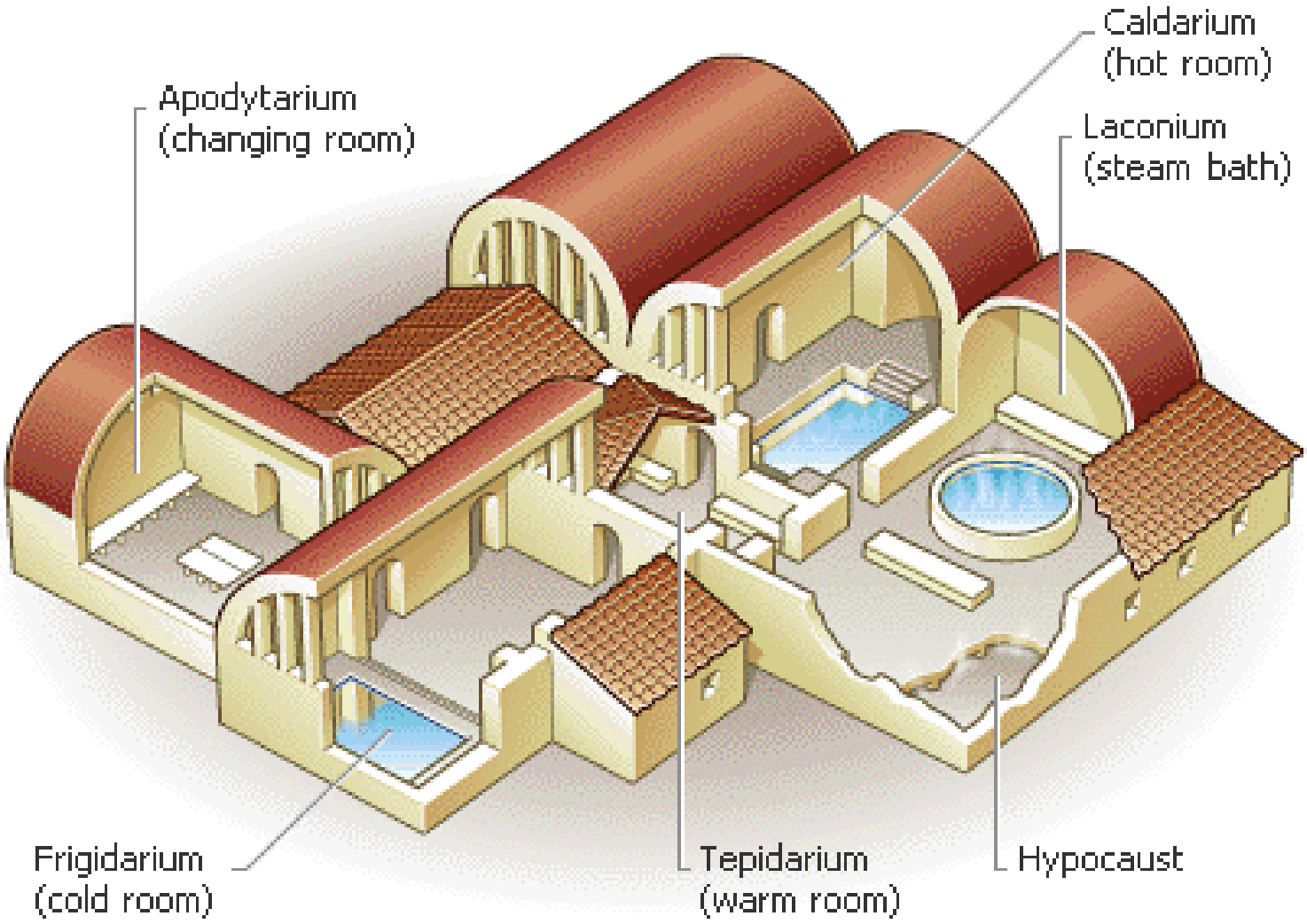
Baths of Caracalla, Rome



BATHS OF CARACALLA

A.	Frigidarium (Swimming Pool)
B.	Great Hall
C.	Nymphaeum
D.	Calidarium
EE.	Lounges
FF.	Lecture Halls
GG.	Palaestra
HH.	Vestibules
JJ.	Courts
LL.	Dressing Rooms
MM.	Steam Baths
N.	Main Entrance
OO.	Shops
PP.	Gymnasia
QQ.	Nymphaea
RR.	Study Rooms
S.	Steps to Portico
TT.	Libraries
UU.	Promenades
VV.	Cisterns
Z.	Aqueduct and Reservoir
aa.	Façade of External Enclosure
bb.	Entrance to the Baths
cc.	Game and Sport Rooms
dd.	Fountains
ee.	Podia of Colonnades

Baths of Caracalla, Rome



v. Roman Theatre

- **Roman theatre differed in several respect from those of the Greeks.**

Greek Theater	Roman Theater
1. Situated on natural slopes thus located around mountainous sites	Supported by their own framework of piers and vaults, thus could be constructed in the hearts of cities.
2. Greek audience went for deep religious convictions	Roman audience went to the theatre for entertainment.
3. Auditorium was excavated from the surrounding hill.	Auditorium was not excavated and the walls surrounding the stage and the seating area were continuous.
4. Stage was not raised.	Stage was raised.

Concepts behind the evolution of the Roman free standing theatre;

- **Etruscans dancers and musicians in 364BC brought temporary wooden stands for the spectators, and the stands later developed into the Roman auditorium, built up entirely from the level ground.**
- **They also brought to perfection the principles of barrel and cross vaulting, penetrating the seat bank at regular intervals with vomitoria (exit corridors).**
- **The theatre was roofed and the number of entrances to it was increased to five; three, as before, in the wall at the rear of the stage and one at each side.**
- **As every seat had to have a view of the stage, the area occupied by the seating (cavea) was limited to a semicircle.**
- **During the Roman Empire, civic pride demanded that all-important cities have theatres, amphitheatres, and a small, permanently roofed theatre as well.**

vi. Amphitheatres

- **Free-standing building of round or oval shape with a central area (the arena), and seats concentrically placed around it.**
- **Amphitheatre is a Greek word meaning 'theatre with seats on all sides'.**
- **Suitable for the entertainment that these people cherished – gladiatorial games and venationes.**
- **Most Roman amphitheatres were constructed with elaborate labyrinth below the arena.**
- **The passages included media way for scenery, elevators spaces and machinery that lifted the animals and stage sets, and rooms for the gladiators, were ingeniously arranged to connect by means of many trap-doors, with the arena above.**
- **The spectators seats run around the arena, and its separated from it by high wall topped by a metal screen.**
- **Spectator seats are divided by passageways running around the amphitheatres into several sections (maeniana).**
- **The lowest section or podium has a special box for the emperor and his retinue; other distinguished guests, ambassadors, priests, consuls and vestal virgins are seated on the opposite side of the emperor.**
- **The rest of the first gallery contained seats for senators and those of the equestrian rank.**

vi. Amphitheatres

- The second gallery was reserved for patricians, the third for plebeians, and the fourth or uppermost gallery, for women.
- An awning (velarium) was manipulated by sailors to shelter the spectators from the sun.
- Each of these galleries was divided into wedged-shaped sections (cunei) by radial walks that led to the many exits (vormitoria).
- The largest and the most important amphitheatre of Rome was the Colosseum.

Colosseum, Rome

- Originally called Flavian Amphitheatres because it was built under the Flavian Emperors but later changed to Colosseum because of the colossal statue of Nero that stood beside it.
- Built by the Emperor Vespasian, and his sons - Titus and Domitian in about 70-80AD.
- Officially dedicated in 80AD by Titus in a ceremony that included 100 days of games.
- It was considered a great architectural and engineering feat for the following reasons:

a. free-standing, multi-level structure of stone and concrete.

b. grandeur in scale and decoration

c. its layout facilitated both the production of extravagant spectacles

d. crowd control of the large numbers of people attending the events

Colosseum, Rome

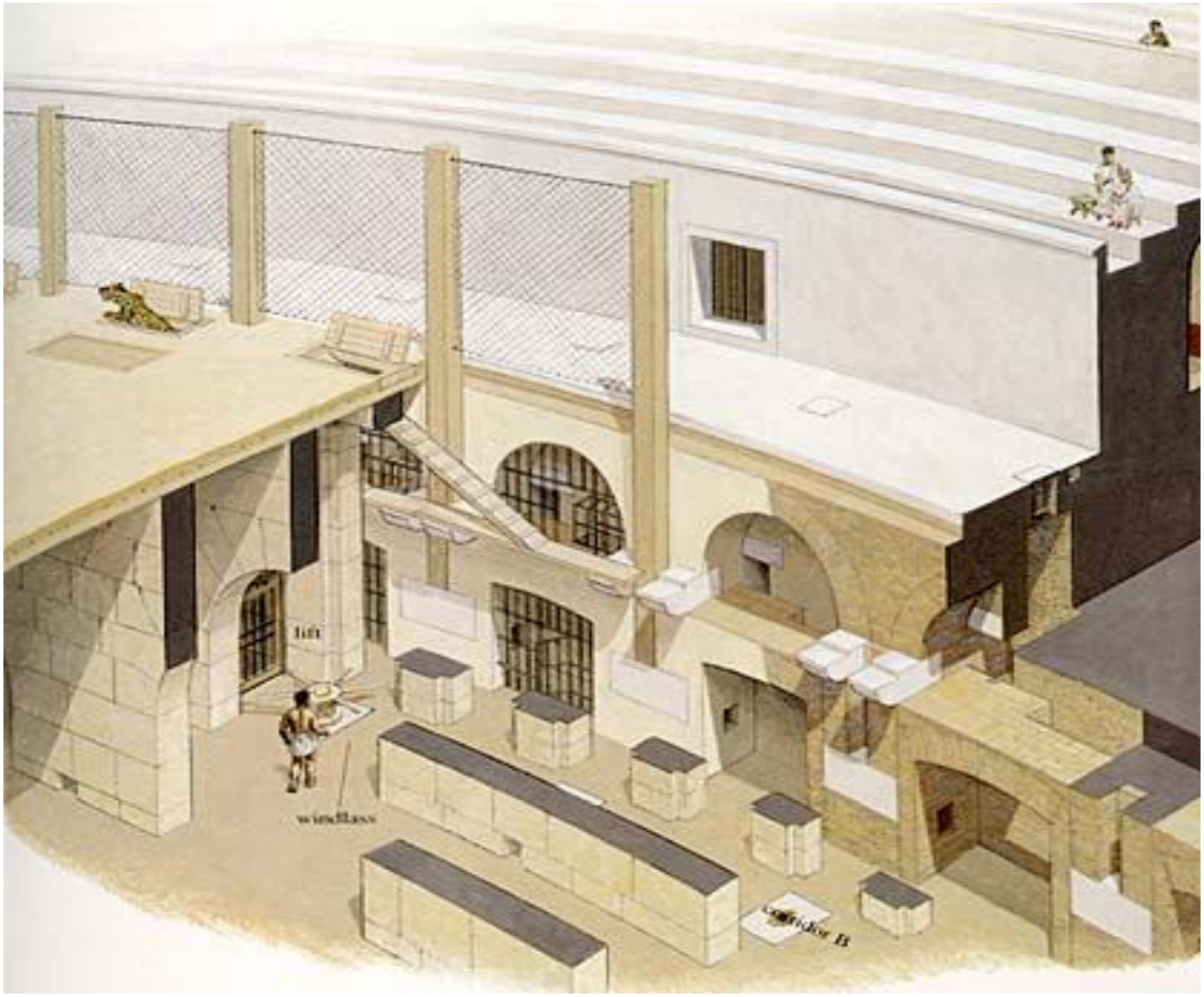
- External measurement is 190m by 155m and the outer façade is roughly 48.5 m high.
- It has three tiers of arches of superimposed columns—Tuscan capitals on the first level, Ionic on the second, and Corinthian on the third—and an upper level of Corinthian pilasters and small square windows.
- Seating capacity for 50 000 spectators
- 80 entrances so arranged that the building could be cleared quickly.
- Built of concrete and stone, the exterior faced with travertine and the interior with precious marbles.
- Tiered seating offered a better view of the games for a greater number of people.
- Scene of thousands of gladiatorial contests, contests between men and animals, and mock naval battles.
- Also used for staged battles between wild beasts (lions) and Christians among other spectacles.
- Stage of the arena was made of wood which was covered with sand to absorb the blood of wounded gladiators and wild beasts.
- The Colosseum was damaged by lightning and earthquakes in medieval times and, even more severely, by vandalism; all the marble seats and decorative materials have disappeared.
- A restoration project was undertaken in the 1990s.

Colosseum, Rome

Colosseum, Rome

Colosseum, Rome

Colosseum, Rome



Colosseum, Rome

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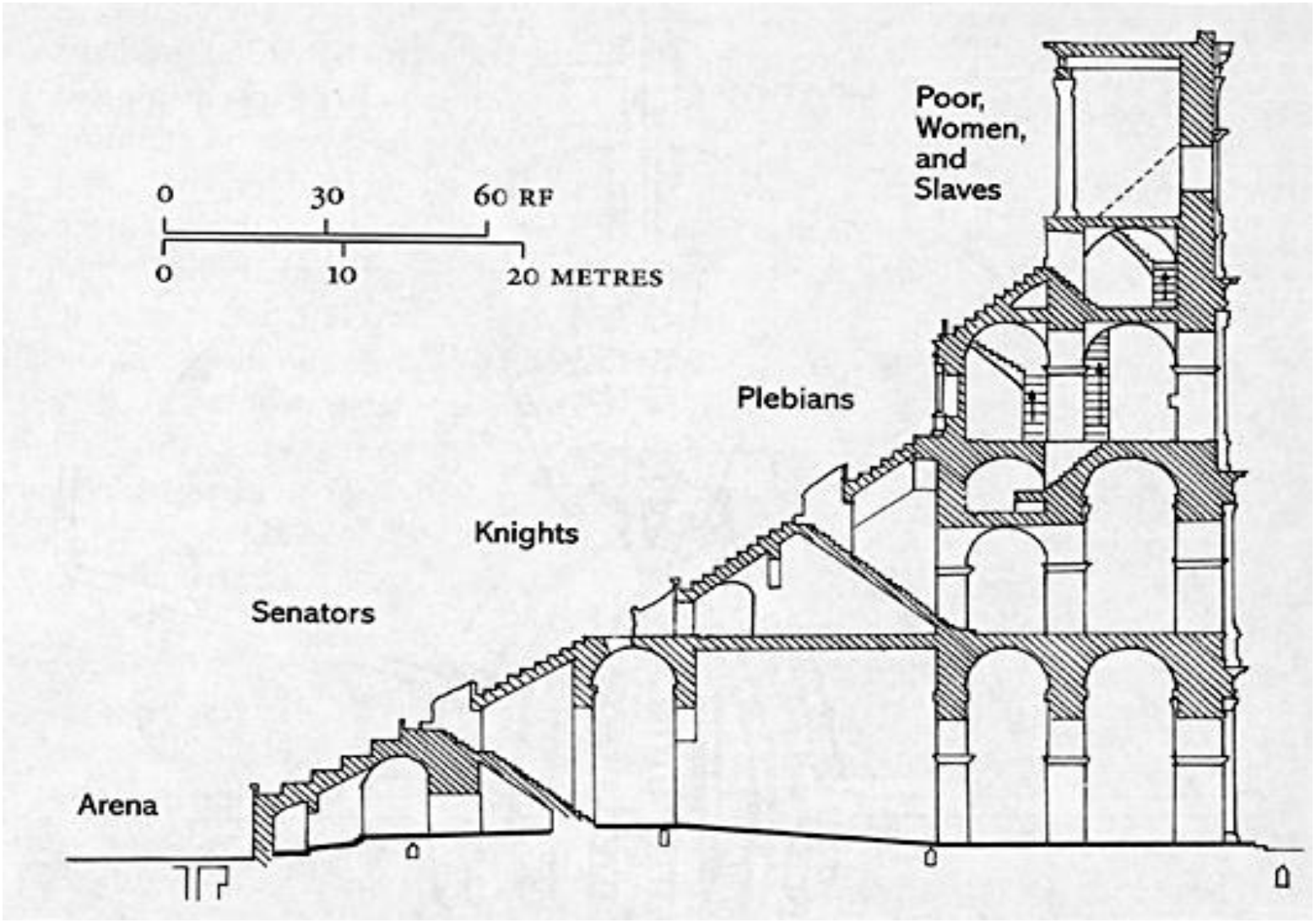


The Circus

- The circus was the Roman version of the Greek hippodrome and consisted of a long circuit for chariot races.
- It was essentially a racecourse lined with tiers of seats along all sides of the arena except at one end where the stalls for the horses and chariots were located.
- The opposite end is squared-off and provided with arrangements for chariots to enter and draw up for the start.
- There is a barrier in the middle on which judges and referees might perform their functions.
- The circus was also used for spectacles other than racing such as, traditionally, the burning of Christians by Emperor Nero.
- The largest and doubtless the finest ever built was the Circus Maximus in Rome.

Circus Maximus, Rome.

- It was the largest of the Roman hippodromes and one of the largest sport arena ever built.
- A U-shaped structure with seats on three sides and a low wall, the spina, running down the middle of the arena around which the chariots raced.
- It was built around 600BC and rebuilt in the time of Julius Caesar (1st century BC) to seat an estimated 150 000 spectators.
- It was enlarged by later Emperors until it reached a maximum size under Emperor Constantine (4th century BC) of external dimension of about 610m long and 190m wide, with a seating capacity of about 250000, greater than that of any subsequent stadium ever built.

Triumphal Arches

- They were erected to commemorate an important event or campaign.
- They were often isolated rather than built to span a roadway.
- The triumphal arch was usually decorated with columns and bas-reliefs of the chief events it commemorated and was frequently surmounted by sculpture.
- Its basic form consisted of two piers connected by an arch and crowned by a superstructure, or attica, that served as a base for statues and bore commemorative inscriptions.
- The function of the arch, therefore, seems to have been that of an honorary monument of unusual importance.
- The most important of these arches are the Arch of Titus (Arco di Tito) c. 81AD, commemorating the capture of Jerusalem, and the Arch of Septimus Severus (c. 203AD) and the Arch of Constantine (c. 315AD).

Arch of Titus, Rome

- Erected by Domitian in honour of his father Emperor Vespasian and brother, Titus around 81AD.
- It was built to commemorate their victories in the Judean War and the conquering of Jerusalem by Titus in 70AD.
- Tradition says that not even one Jew ever passed under the arch, unwilling to pay homage to those who destroyed their temple.
- Relieves on it shows the triumphal procession bringing the spoils from Jerusalem.
- In the center of the vault is the statue of Titus, who is mounting the eagle.
- The arch is 15m high and 13.5m wide.

Arch of Titus, Rome

Monumental City Gate

- **Just like triumphal arches, they sometimes serve a commemorative purpose.**
- **However, they differ from triumphal arches because they serve as part of the defenses of the city.**
- **The most famous are the Porta Nigra at Trier in Germany and the gate from Miletus in Turkey.**

Bridges

- The bridges of the Romans ranked among their greatest monuments.
- The Romans began organized bridge building to help their military campaigns.
- The discovery of pozzolana, a natural cement aided the Romans in building piers in rivers.
- Roman bridges are characterized by the use of the circular arch form.
- The circular arch allowed for spans much longer than stone beams, and for bridges of more permanence than wood.
- For longer bridges which necessitate the use of several arches, the building of stronger piers was critical.
- To build a strong pier, it has to be built on bedrock, which is a problem in a wide river with a soft bed.
- The Romans developed the cofferdam – a temporary watertight enclosure made from wooden piles driven into the river bed to make a sheath, which was often sealed with clay, from which water is pumped to expose the bed of a body of water in order to permit the construction of a pier or other hydraulic work.
- Concrete was then poured into the water within the ring piles.
- Most surviving Roman bridges were built on rock, but the Sant'Angelo Bridge in Rome stands on cofferdam foundations built in the Tiber River about 1800 years ago.

Aqueducts

- **Aqueducts (Latin *aqua*, 'water', and *ducere*, 'to lead') are man-made conduit for carrying water.**
- **They are artificial structures built to transport water across a hollow or valley.**
- **In modern engineering, 'aqueducts' refers to a system of pipes, ditches, canals, tunnels, and supporting structures used to convey water from its source to its main distribution point.**
- **The elaborate aqueducts system that served the capital of the Roman Empire however remains a major engineering achievement.**
- **From 312BC to 226 AD, eleven aqueducts were built to bring water to Rome, some from as far away as 92km.**
- **Only a portion of Rome's aqueducts system actually crossed over valleys on stone arches, the first being the Aqua Marcian in Rome, which is about 90 km long and built by the praetor Marcius in 144BC.**

Aqueducts

- Majority of the system consisted of underground conduits made mostly of terracotta pipe, leather, lead and bronze.
- Water flowed to the city by force of gravity alone and usually went through a series of distribution tanks within the city.
- Rome's famous fountains were also supplied in this way.
- The surviving aqueduct monument is the Pont du Gard aqueduct near Nimes in southern France, completed in 14 AD.
- The structure was built to channel water from from a spring 50km from Nimes and have three tiers of semicircular arches, with the top tier rising more than 48m high above the Gard River.
- Roman aqueducts were built through out the Roman Empire in Greece, Italy, France, Spain, North Africa and Asia Minor.
- As central authority fell apart in the 4^{th} and 5^{th} centuries, the systems also deteriorated.

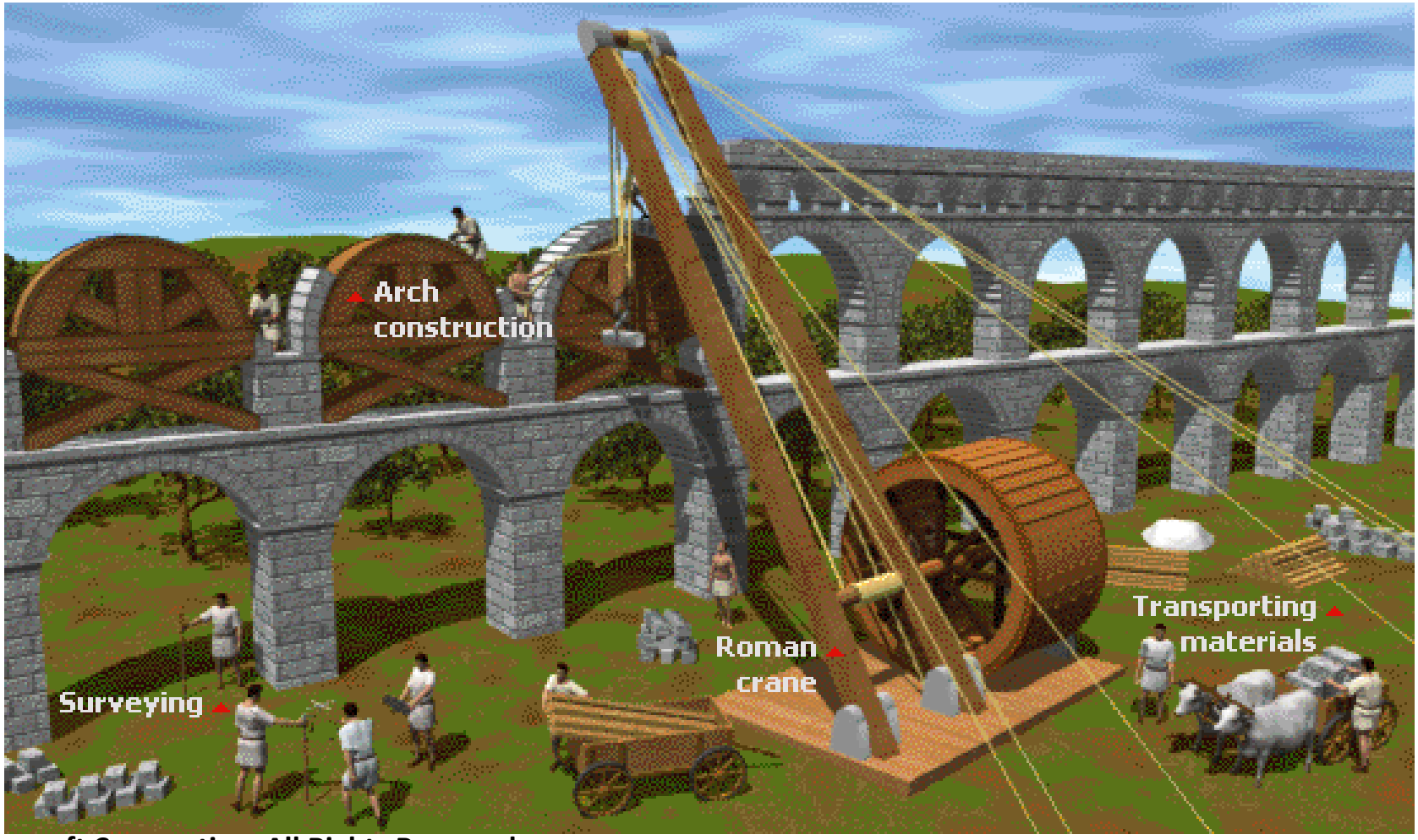
Aqueducts

Arcaid/Justin Paul

Pont du Gard, Nîmes

The aqueduct known today as the Pont du Gard was built in the 1st century BC. Water, tapped from a local spring to supply the Roman city of Nîmes, flowed along the topmost tier of arches. It is considered to be the greatest of all aqueducts, and in 1985 it was inscribed on the UNESCO World Heritage list.

Aqueducts



Roman Aqueduct

Aqueducts, which brought water from mountain springs to the cities, were supported by huge arches made of stone blocks held together with cement. Teams of labourers were able to lift heavy stones into place with the aid of pulleys and cranes that were powered by wooden treadmills. Once the water reached a city, it was stored in basins and tanks and then distributed by an elaborate system of underground pipes for drinking, as well as for public baths and lavatories.

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References

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Joan's and Ken's Egyptian Holiday. Pyramids of Giza: Excavations and Tombs **http://www.kenseamedia.com/jkegypt.htm**

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